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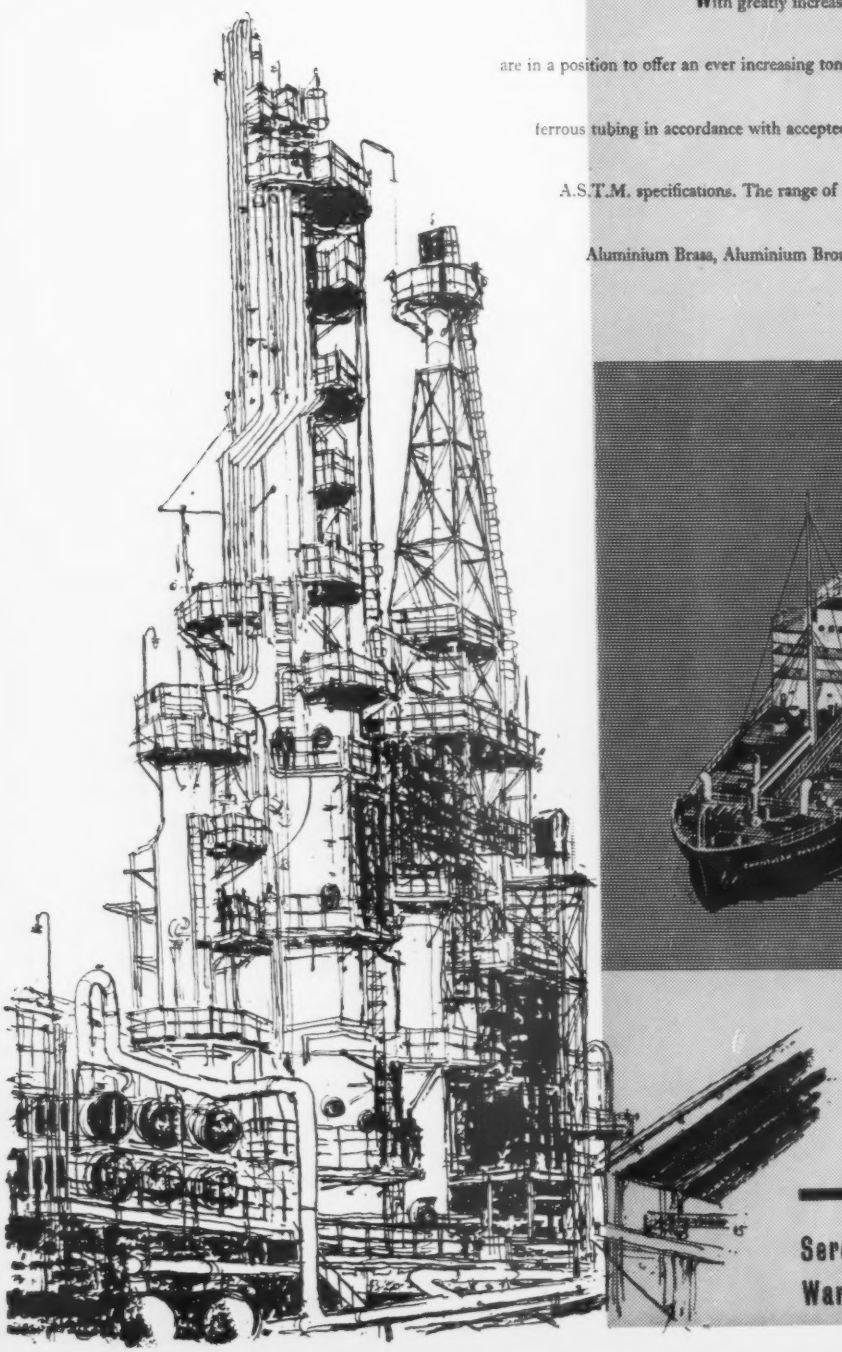

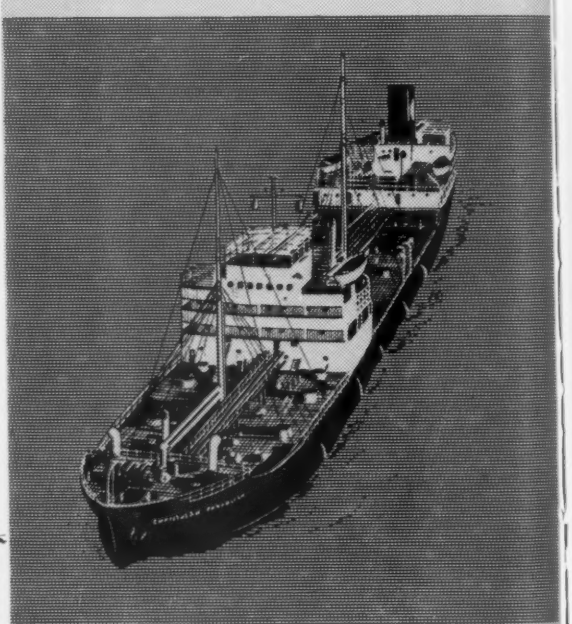

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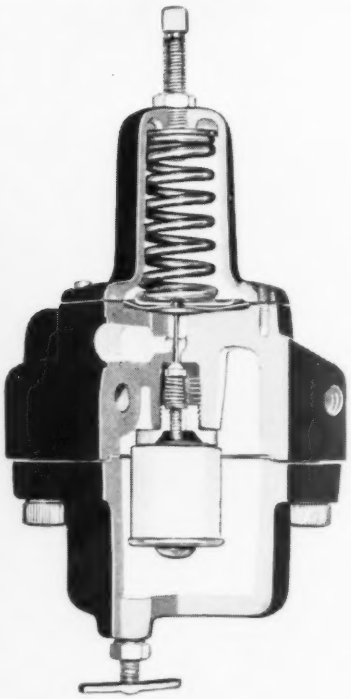

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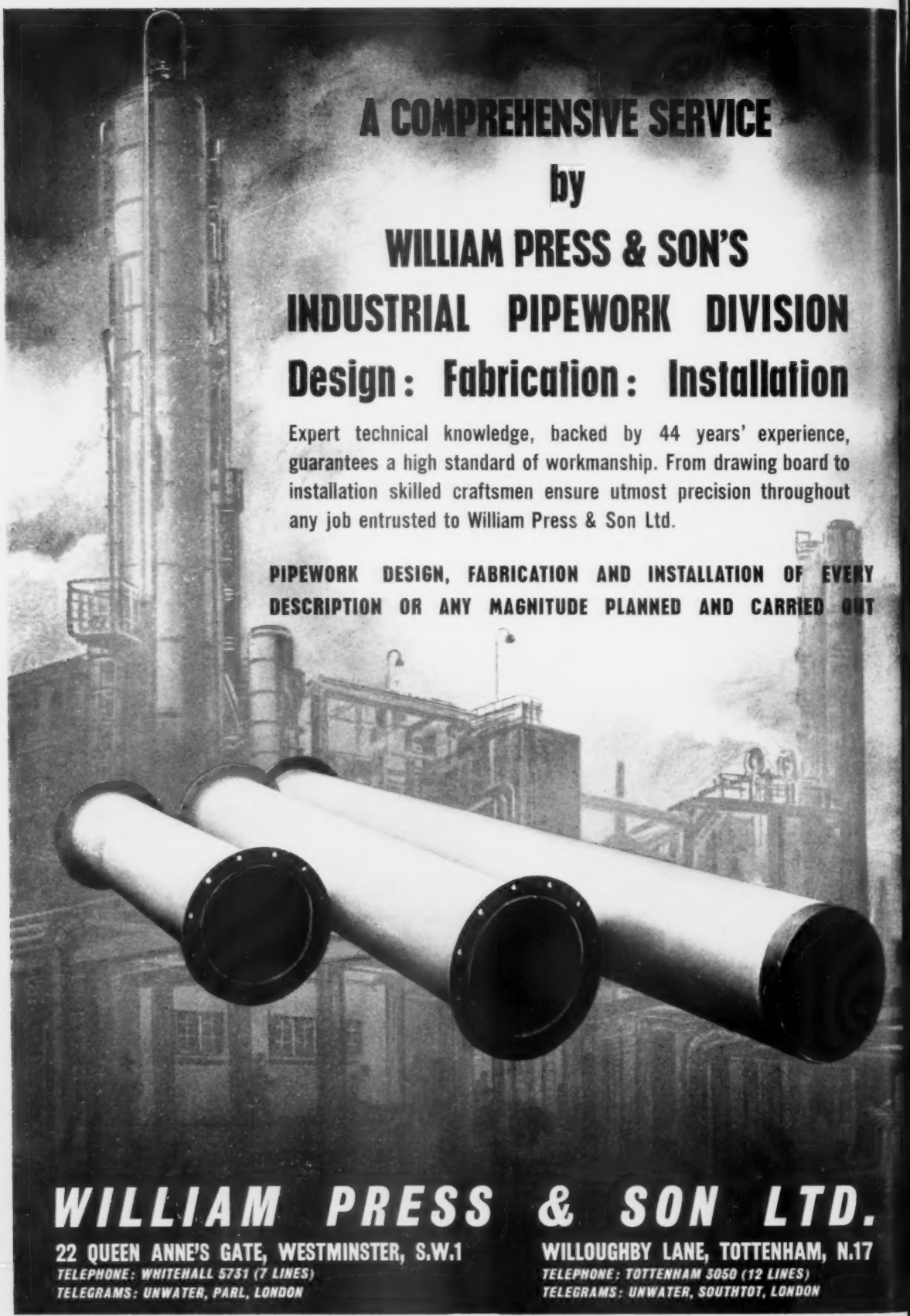

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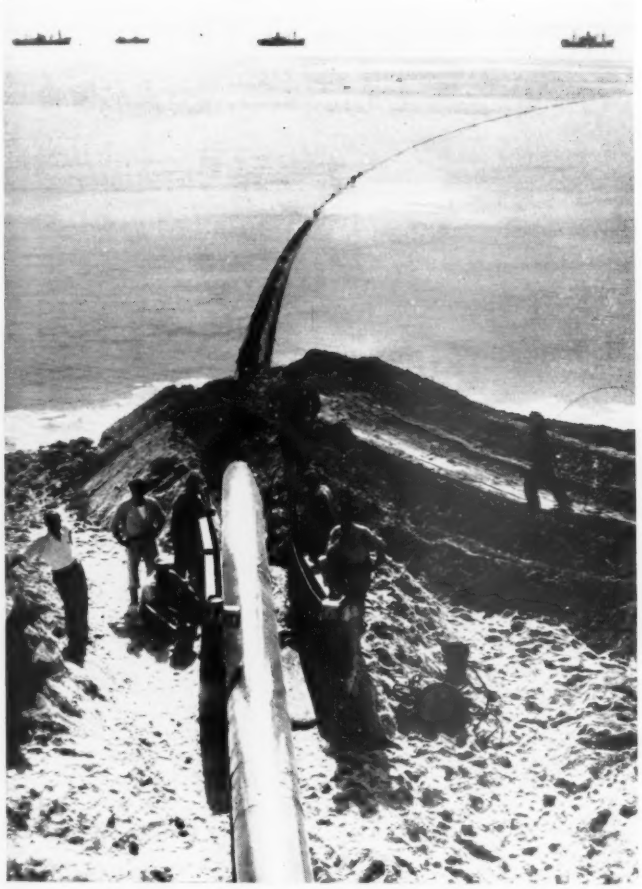

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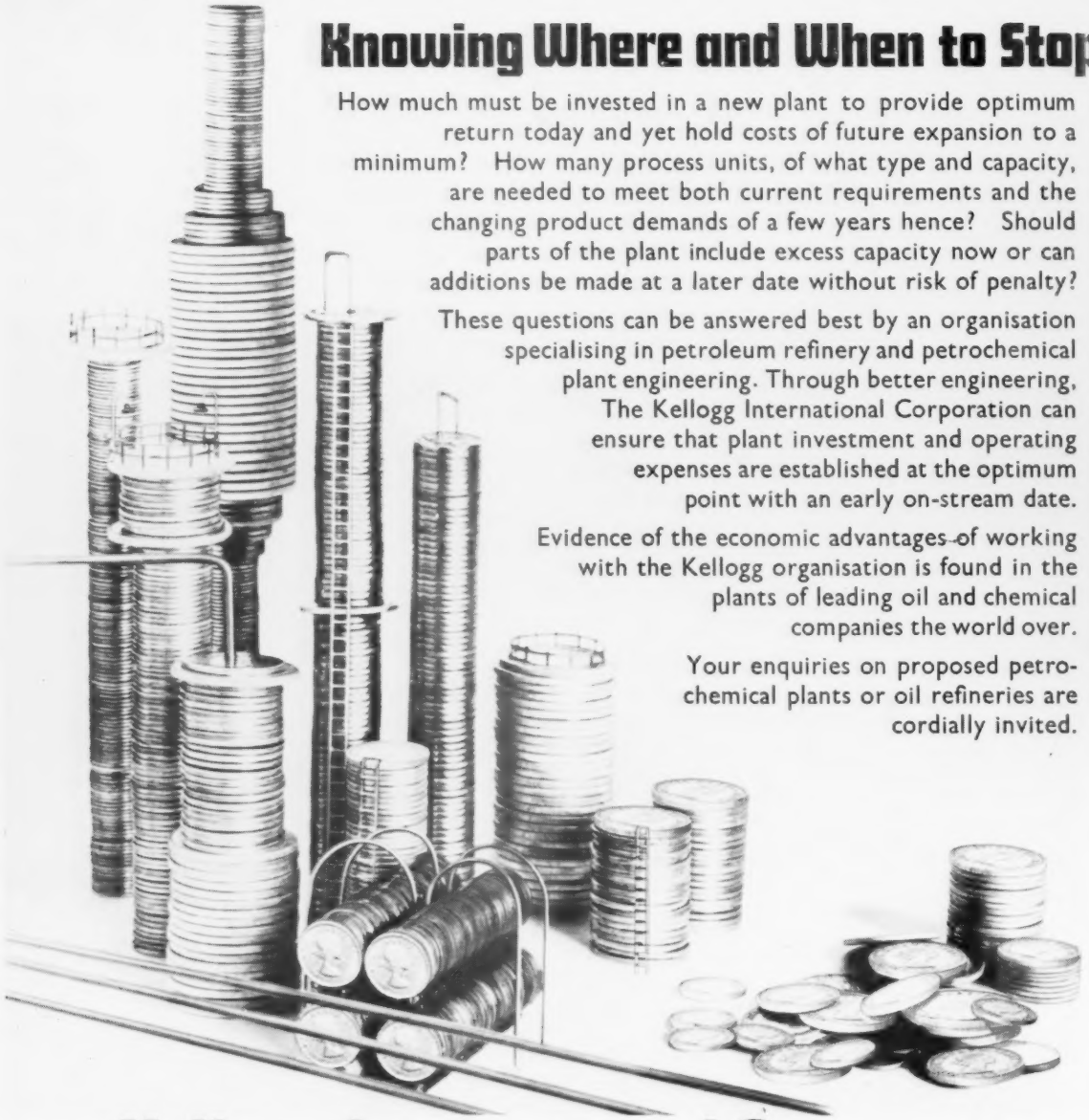

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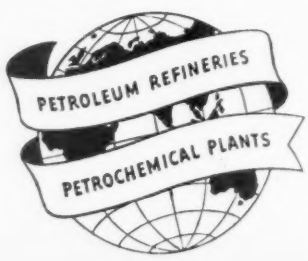

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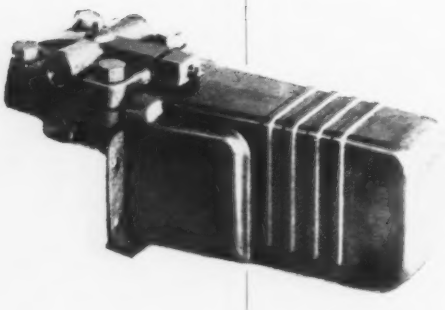

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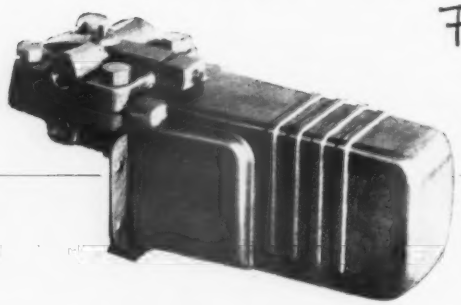

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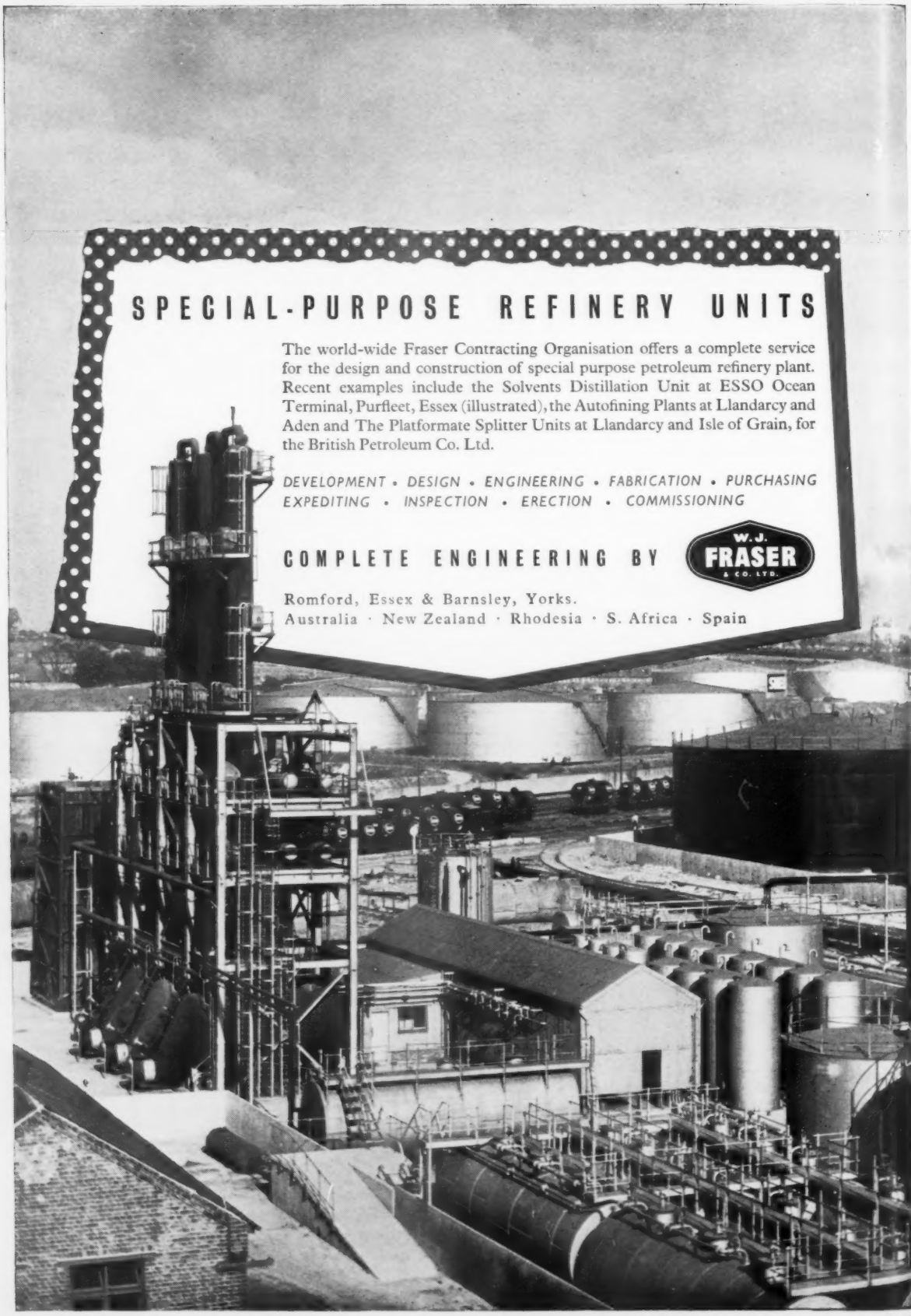
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REVIEW

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The Cadman Lecture and Medal

On 24 October in the presence of a large gathering in the hall of the Royal Institution of Great Britain, the Right Honourable Lord Godber, of Mayfield, chairman of The "Shell" Transport and Trading Company Limited, read the Fifth Cadman Memorial Lecture and received the Cadman Medal.

The Lecture

The subject of the lecture was "Oil and Education". Acknowledging the honour conferred upon him, Lord Godber outlined the career of Lord Cadman and said: "By some standards, ours is a young industry, but thanks to Cadman and others of his stamp it has reached maturity at an early age, and with this maturity (I am proud to say) it has achieved the respect of the world.

"What Cadman brought to the industry was not only his intellectual gifts and a deep understanding of his fellow men, but a particularly wide experience of the various fields in which these may be applied."

Turning to the subject of his lecture, Lord Godber said there was a danger that man's power of invention could outstrip his sense of responsibility. The problem was not to curb genius, but to apply the spur to ethics.

Industry and business had an inescapable responsibility and a great responsibility devolved on companies with world-wide interests who could view international development as a whole. Such were the oil companies, for the oil industry traded in scores of countries and was woven into the pattern of every country.

So rapid was the growth of technological progress that some countries were obtaining material prosperity in less than one-tenth of the time that it had taken Britain to assimilate the benefits of the industrial revolution of 150 years ago.

The future of any land must be based on raising the standard of living through technological development, but technologists were in short supply. Technology must not be allowed to turn to specialization.

Too often it was the educational services that lagged behind. Good education needed good teachers who needed good education.

In a fast-developing country there was bound to be competition for priority in projects of national importance. Regard was also given to relative popular appeal.

Parallel with the technological advances of to-day was a new spirit in literature and the arts. The petroleum industry, and the world, needed men of science with appreciation of the arts, and arts men with an understanding of science.

The Rt. Hon. Lord Godber delivering the Fifth Cadman Lecture

In the oil industry the right men and the right jobs varied between countries, and so did the difficulties of persuading nations to realize the importance of those jobs. The industry and the individual companies realized the part they had to play in each country in developing education. In some countries the industry had introduced a new educational requirement which no government could meet quickly.

Lord Godber then referred to the steps which companies in the oil industry had taken to stimulate or assist education throughout the world.

In Great Britain the most serious "leak" in the educational system was the loss from grammar schools at 16 of potential university material drawn away by the wage-earning power of the adolescent in industry.

Part of the audience at the Lecture. In the front row, immediately behind the President, Lord Geddes, are (left to right): *Lord and Lady Cadman, Lady Geddes, Lady Godber, Mrs O. Thompson, and Oliver Thompson*

Industry might have to increasingly subsidize to keep at school until 18 those it wished to come to it with a degree or diploma.

In some countries the cost of secondary schooling and the rewards in industry were lower, but poverty of parents made greater the temptation to go out and earn. The steps taken in various countries to counteract this were referred to.

Lord Cadman was a great educationalist and the Department of Chemical Engineering at Birmingham University was primarily due to his vision. A Chair of Chemical Engineering had been established at Cambridge, and other universities were being helped by oil concerns.

It might be extremely useful to investigate how science and everyday life could be brought more usefully together in the minds of pupils before they began to specialize.

Looking at the efforts of the petroleum industry chronologically it would be seen that the first interest in education was limited to vocational training after a man had joined the industry. Then it was realized that certain basic knowledge acquired earlier was of great importance. The needs of the industry were constantly changing and so did the emphasis of this knowledge; *e.g.* from geophysics to chemical engineering. This meant an incursion into education at a specific point for a specific purpose.

Meanwhile, two streams in the industry continued to grow. First, the training of employees, which had broadened into something wider than the narrow application of a technique. The other stream was that which carried the children of employees, and often the company school was handed over as part of national education.

Concluding, Lord Godber said: "Above the door of every school in Persia is written a quotation which ends, 'with knowledge the old heart becomes young'. This is a plea we hear in all the countries to which our operations call us; and I say in no boasting spirit but in all humility that we may be proud of the part we are playing in meeting this cry."

The Presentation

At the conclusion of the address the chair was taken by the President of the Institute, the Right Honourable Lord Geddes who, in presenting the Cadman Medal to Lord Godber, said: "Not only the Institute of Petroleum but the whole of the petroleum industry looks back with gratitude to the service of the late Lord Cadman, who twice was President of the Institute.

"In 1946 the then Anglo-Iranian Oil Company established in his memory the Cadman Memorial Fund, of which the Institute is Trustee. The purpose of this Fund is to provide a Medal to be awarded at least once every three years to men of any nationality who have made outstanding contributions to the petroleum industry in general, and in particular to petroleum technology or hydrocarbon chemistry, and who have delivered a lecture such as we have just heard.

"This is the fifth occasion upon which the Medal has been awarded.

"I deem it a great honour that it should fall to me, sir, to thank you for your most interesting address and to award this Medal to you.

"On behalf of the Institute of Petroleum and all those present, thank you very much."

Lord Godber receives the Cadman Medal from Lord Geddes

After receiving the Medal to the accompaniment of prolonged applause, Lord Godber signed the Book of Honour and expressed his thanks to the Council of the Institute of Petroleum and to his colleagues in the petroleum industry for the great honour which had been bestowed upon him.

Previous Awards

As the President said in presenting the Medal to Lord Godber, this was the fifth award since the first in 1946 to Sir William Fraser, C.B.E. (now Lord Strathalmond), then chairman of the Anglo-Iranian Oil Company Ltd. Subsequent awards were: in 1947 to Robert Price Russell, president of Standard Oil Development Company, whose Address was on "Progress in Petroleum Research"; in 1951 to Robert E. Wilson, chairman of the board of Standard Oil Company (Indiana) whose Address was entitled "Competitive and Co-operative Research in the American Petroleum Industry"; in 1954 to C. A. P. Southwell, C.B.E., M.C., managing director of the Kuwait Oil Company Ltd, whose lecture dealt with "Winning Petroleum".

The Cadman Dinner

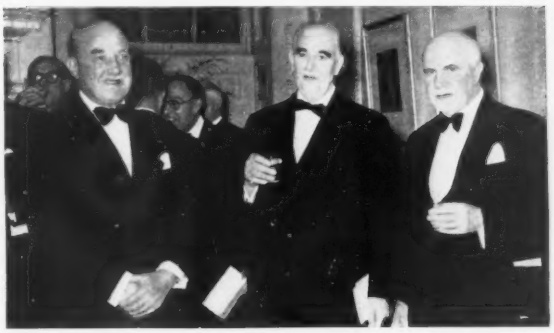
Later, Lord Godber was the guest of honour at the Cadman Memorial Dinner, held in the Hall of The Skinners' Company, where a noteworthy company assembled under the chairmanship of Lord Geddes. Those present were:

T. C. Bailey (*vice-president, Institute of Fuel*); J. P. Berkin (*a managing director of The Shell Petroleum Co. Ltd*); N. P. Biggs (*a managing director of Esso Petroleum Co. Ltd*); L. M. Broadway (*deputy chairman and managing director, C. C. Wakefield & Co. Ltd*); S. Collier (*managing director, Cleveland Petroleum Co. Ltd*); Admiral Sir John Cunningham (*chairman, Iraq Petroleum Co. Ltd*); Vice-Admiral N. E. Dalton (*Engineer-in-Chief to the Fleet*); R. E. F. De Trafford (*chairman, Manchester Oil Refinery (Holdings) Ltd*); R. B. Dummett (*a managing director of British Petroleum Co. Ltd*); W. E. Eadie (*chairman, Burmah Oil Co. Ltd*); H. W. Fisher (*director, Iraq Petroleum Co. Ltd*); Sir Donald Ferguson; J. L. Flanagan; Sir Alexander Fleck (*chairman, Imperial Chemical Industries Ltd*); J. C. Gridley (*chairman, Mobil Oil Co. Ltd*); T. R. Grieve (*The Shell Petroleum Co. Ltd*); Professor L. Hawkes (*president, Geological Society*); A. Hofland (*director, The Shell Petroleum Co. Ltd*); J. Houston Jackson (*director and general manager, BP Tanker Co. Ltd*); J. A. Jameson; A. B. Lawrence, Jr. (*managing director, Caltex (U.K.) Ltd*); Sir Alexander McColl; D. R. Mackintosh (*The Shell Petroleum Co. Ltd*); Sir John Maud (*Permanent Secretary, Ministry of Power*); J. M. Pattinson (*a managing director of British Petroleum Co. Ltd*); L. W. Perkins (*director and general manager, Cleveland Petroleum Co. Ltd*); J. W. Platt (*director, The Shell Petroleum Co. Ltd*); W. Richardson; Sir Robert Robinson; H. W. Rocke (*managing director, Mobil Oil Co. Ltd*); H. W. Rowbottom; Sir Leonard Sinclair (*chairman, Esso Petroleum Co. Ltd*); R. P. Smith (*assistant managing director, Burmah Oil Co. Ltd*); H. E. Snow (*a deputy chairman of British Petroleum Co. Ltd*); F. J. Stephens (*a managing director of The Shell Petroleum Co. Ltd*); Lord Strathalmond; H. C. Tett (*a managing director of Esso Petroleum Co. Ltd*); O. F. Thompson (*The Shell Petroleum Co. Ltd, and Master of the Skinners' Company*); B. M. C. Trench (*The Shell Petroleum Co. Ltd*); W. F. Wackrill (*director, Esso Petroleum Co. Ltd*).

Members of Council of the Institute of Petroleum present were: (*past-presidents*) Lt-Col S. J. M. Auld, T. Dewhurst, E. A. Evans, Professor F. H. Garner, Sir H. S. Gibson, and C. A. P. Southwell; (*vice-presidents*) Dr E. B. Evans, A. C. Hartley, E. LeQ Herbert, H. Hyams, and E. J. Sturgess; (*Council*) W. S. Ault, F. L. Garton, M. E. Hubbard, J. E. Jewell, E. C. Masterson, J. S. Parker, A. J. Ruthven-Murray, D. L. Samuel, G. H. Thornley, Dr C. G. Williams, and C. S. Windebank; G. H. Coxon (*hon. treasurer*); C. Chilvers (*hon. secretary*); D. A. Hough (*general secretary*); George Sell (*editor*); E. Herbert (*technical assistant*).

Lord Geddes, proposing the toast of Lord Godber, rephrasing the mathematical formula "three in one and one in three" said he wished to extend that to "four in one and one in four" and to designate this as a quartet. His quartet was Godber, Mr Godber, Sir Frederick Godber, and Lord Godber, a quartet which had the remarkable period of fifty-three years' service to the oil industry, for it was in March 1904 that Shell engaged an office boy called Godber.

Lord Geddes said he entered the scene in the second phase when it was Mr Godber of Roxana, the Middle West oil man. Continuing, his Lordship said; "Throughout the years which have elapsed, we have been able to watch the singleness of purpose, the wisdom, and always the kindly guidance from



Lord Godber with (left) *C. A. P. Southwell, a Cadman Medallist, and* (right) *T. Dewhurst, at the Cadman Dinner*

F. J. Stephens, Sir Stephen Gibson, and J. A. Jameson, at the Cadman Dinner

Sir Leonard Sinclair chats with Lord Godber at the Dinner and—

—Admiral Sir John Cunningham has a word with Lord Strathalmond

whichever of the Godbers happened to be with us at the time. Mr Godber did a great deal in the direction not only of his own Group, but of the industry in the pre-war years; it was on the shoulders of the Sir Frederick Godber that there fell the heavy responsibility of running the Overseas Supply Committee of the Petroleum Board during the war, and to him goes much of the credit for the outstanding job which the industry performed in the maintenance of petroleum supply for Great Britain and for the war in Europe.

"Finally, we come to Lord Godber, one of the great figures not only of the industry but of industry generally; an elder statesman who by his own sheer merit has become one of the giants to whom the lesser mortals who follow will look back and say 'Those were the days'.

"Gentlemen, I give you the toast of all four, and in them the one continuing Godber for whom we all have such a high respect."

Lord Godber, acknowledging the toast, said that he was very touched by the oratory, the kindness, and the glowing tributes which had been paid to him by Lord Geddes. He was very gratified in having been invited to deliver the Cadman Lecture earlier that day and to receive the Cadman Memorial Medal.

He also much appreciated the dinner, the entertainment, and the presence of so many friends who were gathered around that table.

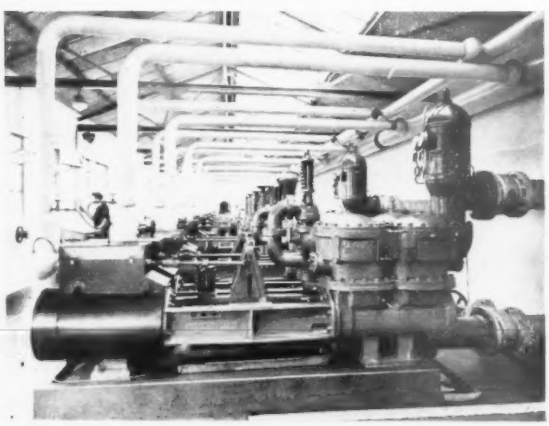
Invited by the president to say a few words, **Lord Strathalmond** said that he had been pleased to hear the excellent address which Lord Godber had delivered that afternoon. He had been associated with Lord Godber for many years. In reference to the Cadman Memorial Lecture Lord Strathalmond pointed out that the real creator of the idea of perpetuating the memory of Lord Cadman was Sir Frank Smith. Lord Strathalmond said he himself was very proud of the medal which he had received many years ago. **Sir John Maud**, in a short speech, said he wished to add his tribute to Lord Godber and at the same time thought it appropriate to propose a toast to the Skinners' Company and to Oliver Thompson, the Master of that Company, for making their very fine hall available for the dinner. **Oliver Thompson**, O.B.E., in acknowledging the toast, briefly outlined some of the history of the Skinners' Company and concluded by proposing the health of the President which was duly drunk and replied to by Lord Geddes. **Lord Geddes** then invited guests to proceed to the adjoining room where they would be supplied with churchwarden pipes and tobacco and served with wine or whisky as they desired. This ceremony is a long-standing tradition of the Skinners' Company.

During the evening the Westminster Quartette Singers provided entertainment with some excellent rendering of madrigals, glees, and traditional airs.

Enjoying the traditional churchwarden pipes at the Skinners' Hall. (Left to right) *B. M. C. Trench, E. J. Sturgess, and D. A. Hough*

New Distribution Centres for Shell-Mex and B.P. Ltd

In the comparatively short period of 21 days—18 September to 8 October—Shell-Mex and B.P. Ltd opened no fewer than five new distribution centres. Four of these, that is Teesport, Northampton, Scrabster, and Sheffield are completely new points, the one at Preston being a major reconstruction. All are part of the reorganization scheme which, since 1950, has entailed the building of twenty completely new centres and the reconstruction of fourteen others. Capital investment has been high, over £12½ million to date, and a number of projects still remain to be carried out. The extent of the reorganization is illustrated by the statement that in 1950 the Company had 440 distribution points; now there are 120 and eventually it is hoped there will be less than 100.



Fuel oil pump house at the new Teesport installation

The Teesport Installation

This installation, which was formally opened by Sir William Worsley, Lord Lieutenant of the North Riding on 18 September, is one of the biggest ever built by Shell-Mex and B.P. Ltd. Its main purpose is to fuel the steel, chemical, and shipbuilding plants on Tees-side, and to meet the growing demand for bunkers.

Located on reclaimed land on the south bank of the Tees and near its mouth, the Teesport installation occupies an area of 24 acres. A further 23 acres have been leased from the Tees Conservancy for future expansion.

On this site a total of 23 storage tanks, with a total capacity of over 32 million gallons, have been built. The capacities of individual tanks vary from 9000 tons for the biggest fuel oil tanks, down to 500 tons for derv fuel tanks, and still smaller capacities for service tanks. All the main tanks are interconnected by overhead gangways, the tank farm being enclosed in bund walls.

While the main provision is for industrial fuel oil, there is also ample provision for aviation turbine fuel, kerosine, gas oil, derv fuel, and marine diesel fuel.

Incoming tanker cargoes can be discharged direct into the installation storage from either of the Tees Conservancy oil jetties. The longest vessels using the river can also be bunkered at these jetties. The close proximity of the tank farm to the jetties has made a comparatively short pipeline run possible and discharge rates at more than 1000 tons an hour can be reached.

The filling gantry for road tankers is nearly 160 feet in length and has bays in which twelve vehicles can be filled simultaneously. The light oil bays are linked with ten remotely-controlled electric centrifugal pumps and tankers can be filled with either gas oil, derv fuel, three grades of kerosine, or aviation fuel at rates from 250 to 500 gallons a minute.

Black oils are kept in heated storage for delivery, the steam for heating being supplied from three "Economic" automatic oil-fired boilers. Each boiler is rated at 8000 lb steam per hour when burning 3500-second fuel oil, and the battery also supplies steam to the pump house. Here there are seven reciprocating pumps, six of which each have a capacity of 100-200 tons an hour and the seventh 250-300 tons. Exhaust steam from the pumps can be used for heating oil.

Road tankers in the concrete yard of the Northampton Depot

The flow of fuel oil is controlled from the filling gantry by means of quick-action valves operated by the drivers.

Provision has also been made for the filling of rail tank wagons at a double gantry with six filling points on each side. The wagons are marshalled by a diesel locomative.

The lubricating oil store has its floor at tailboard level to facilitate loading and unloading of vehicles. The storage racks are of the latest type and permit the handling of palletized loads of lubricants by fork-lift trucks.

Other features of the Teesport installation include a laboratory for maintenance of quality control, a servicing building for road tankers, a shed for the diesel locomotive, a loudspeaker system, and floodlighting. Complete fire protection, with a pump capable of circulating water at 150 p.s.i. and 1000 gallons a minute through a ring main is installed.

Special attention has been paid to staff welfare, and there are ample washing facilities and heated locker rooms for drying clothes for drivers and outdoor workers. Feeding facilities, complete with a well-equipped kitchen, are also provided.

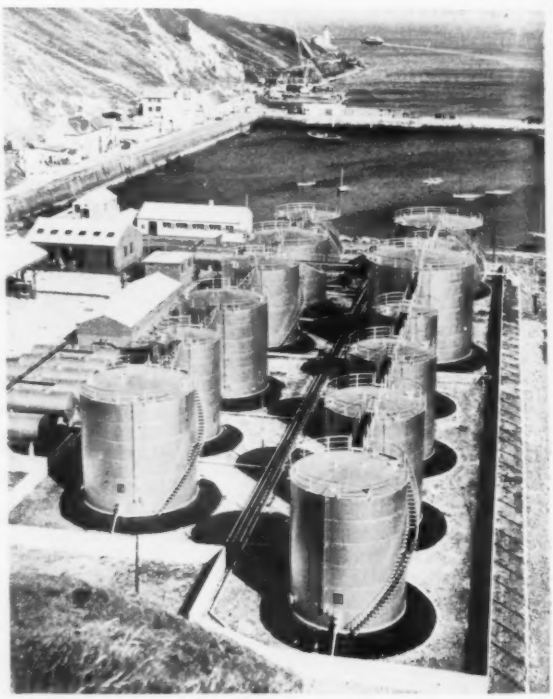
The Northampton Depot

Located on the outskirts of the town, the Northampton Depot was opened on 19 September by the Mayor of Northampton, Councillor F. P. Saunders, J.P. Occupying an area of 3 acres, with a further 4½ acres available for expansion, this depot will serve the important area from Uppingham to Hinckley in the north, Rugby in the west, Towcester to Newport Pagnell in the south, and Oundle in the east.

A coastal tanker bringing products to Preston

All grades of liquid fuel, from motor spirit to fuel oil, will be received by rail from Thames-side refineries, the gantry being capable of handling thirteen rail cars on each side. Nine vertical tanks are available for these products and cars can be discharged at the rate of 50 tons per hour by four lines to four pumps. Lubricating oil will be delivered by road from blending centres in south-west London and stored in two overhead six-compartment tanks for twelve grades. A can and barrel store is also available.

This depot replaces two older depots and will take over part of the delivery area of three other depots.



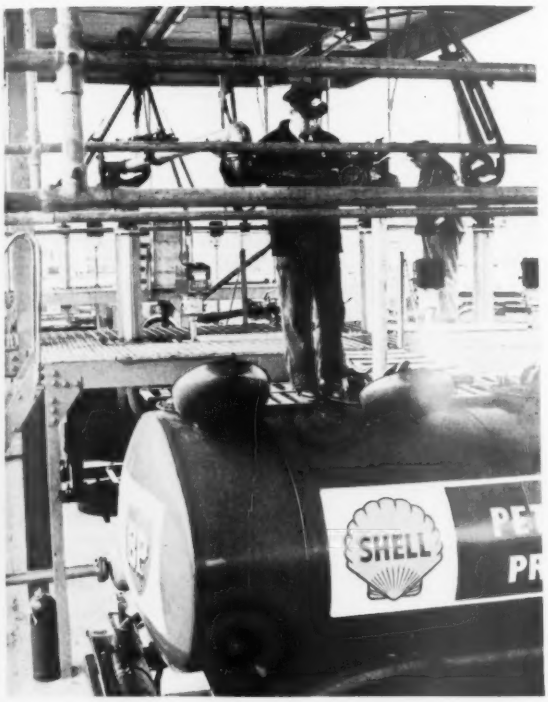
Storage tanks at Scrabster

The Preston Installation

This reconstructed installation replaces four older depots and will serve the East Lancashire industrial centres, and also the holiday centres of Blackpool, Southport, and Morecambe, and the Lake District. It is located on a 5-acre site adjoining Preston Dock and its reconstruction has involved the re-siting of storage tanks with a total capacity of over one million gallons. Although five vertical and six horizontal tanks had to be moved, and new tanks erected, the day-to-day work of the installation continued without hindrance.

The Preston installation will be supplied partly by water and partly by road from the parent company's refineries. A full range of products will be available and arrangements are provided for the metered filling of lubricants into churns and smaller packages.

This installation was opened on 30 September by the Mayor of Preston, Councillor G. Hearn.



Filling a road tanker at Sheffield

The Scrabster Depot

The most northern depot in the Shell-Mex and B.P. Ltd and Scottish Oils and Shell-Mex chain is that at Scrabster, which was declared open on 2 October by Sir David Robertson, M.P. for Caithness and Sutherland. Located within sight of the most northerly point on the Scottish mainland—Dunnet Head—Scrabster will serve the north-east part of Scotland, the western boundary including Bettyhill to the north and Helmsdale to the south. It will also supply the needs of the Dounreay atomic plant for liquid fuels and for special lubricants resistant to gamma or neutron radiation activity.

Area occupied by the depot is about 2½ acres and ample storage is provided by thirteen vertical and eight horizontal tanks, those for the heavier products being steam-heated and lagged. Supplies of products will be brought by 750-ton coastal tankers.

The Scrabster depot replaces old depots at Thurso and Wick.

The Sheffield Installation

Last of the installations dealt with in this article is that at Sheffield, opened on 8 October by Lord Scarbrough, Lord Lieutenant of the West Riding. Located at Ecclesfield, a mile outside the City boundary, it replaces old depots at Sheffield, Doncaster, Barnsley, and Rotherham.

Supplies of refined products will be received from refineries in train-loads, the unloading gantry being capable of handling 24 cars at once. For deliveries there are four filling gantries, and eight road tankers can be loaded simultaneously.

IP PRESIDENT ELECT

The Council of the Institute have unanimously decided to invite C. M. Vignoles, C.B.E., managing director of Shell-Mex and B.P. Ltd, to accept the nomination for election as President of the Institute, for the 1958–59 Session.

Mr Vignoles has accepted this nomination and it will be submitted for approval to the Annual General Meeting in April next.

C. M. Vignoles was educated at Sedbergh and Magdalene College, Cambridge, where he took an honours degree in Mechanical Sciences.

He joined the Shell Group in 1924, and served first in Malaya on the technical side of the Bitumen Sales Department. After transference to the executive side he served in the Shipping Department in Singapore and as Branch Manager in Malacca.

In 1932 he returned to the London Office and worked in the Fuel Oil General Department until war began. In 1940 he became the Shell Petroleum Company's representative on the Overseas Supply Committee of the Petroleum Board, and later Joint Executive Secretary of the Committee. For these services he was awarded the O.B.E. in 1946.

After the war Mr Vignoles was appointed Eastern Area Manager of the Shell Group. At the end of 1950 he became a director of Shell-Mex and B.P. Ltd, and in March 1951 managing director of the Company.

In November 1956 Mr Vignoles became chairman of the Oil Industry Emergency Committee formed to assist the Ministry of Power in dealing with the problems arising from the application of the measures to reduce consumption of petroleum products in the United Kingdom after the closing of the Suez Canal.

In the 1956 Birthday Honours he was awarded the C.B.E.

A man with an exceptionally wide range of interests, Mr Vignoles is a member of the Clean Air Council, the Council of the Institute of Directors, the Council of Operation Britain, and a Trustee of the Civic Trust.

He is currently the Master of the Worshipful Company of Turners and he is a Governor of Sedbergh School.

Photograph by Walter Bird

C. M. Vignoles, C.B.E.

The Choice of Electrical Plant and Equipment for Oilfield Use*

By H. W. S. MARSHALL, D.S.C. (Associate Member)†

Introduction

The subject is a large one and this paper does not attempt to be comprehensive, nor is it strictly technical. Rather, it is intended to consider some ideas by dealing with certain points mainly in general terms. The use of flameproof electrical equipment has deliberately been omitted. This is a subject in itself; such equipment, and when and where to use it, is covered by comprehensive regulations that are widely accepted.

The paper is based on experience in general practice followed by experience in a particular oilfield. Responsibility for any opinions expressed lies with the author alone.

Factors Influencing Choice

These fall into two groups, the first group comprising those factors common to general practice, the second those peculiar to the particular situation.

Common factors will be those such as the duty to be performed, the allowable first cost, the degree of efficiency required, the standard of reliability desired, and so on. In oilfield work it is sometimes desirable to place an emphasis on the relative importance of the factors that are unusual in general practice.

Factors peculiar to the particular situation will include the obvious ones due to climate and geography, and the less obvious ones such as the local fauna and flora, the type of labour available, the possibility of casual or malicious damage, local contamination of the atmosphere, corrosive soil conditions, etc. Local knowledge is usually indispensable to evaluate correctly most of these factors.

Control of Choice

In order to take adequate account of the many factors that can influence choice, an effective central organization is a necessity. Without this, or if such an organization is concerned with a project only when it is primarily an electrical engineering project, or carries a large electrical engineering content, a large amount of miscellaneous electrical plant and equipment, ordered in haphazard fashion, can be built up in a short time, especially in a period of rapid development.

In most cases, this will be supplied as ancillary equipment associated with non-electrical plant or machinery, the supplier having ordered those types or makes of equipment which he happens to favour or which he could most easily obtain at the time. At best this results in troublesome and uneconomic multiplication of spares, and in maintenance difficulties due to the variety of equipment involved; at worst in the supply of equipment unsuited to local conditions.

Reliability

Many oil production processes are continuous and the plant concerned may be expected to function without interruption for unusually long periods; also, any interruptions that do occur can be unusually expensive and inconvenient, and even dangerous. In these situations reliability becomes of first importance and can properly be sought at the expense of, for example, high first cost or low efficiency.

The reliability in service of an item depends on three things. There is the reliability built into it by virtue of the quality of its design and manufacture; there is the manner of its use, *i.e.*, by what margin, if any, the conditions it is designed to meet exceed in severity the service conditions; and there is the manner in which it is associated with other items, *i.e.*, an item cannot be more reliable than any items of ancillary equipment on which it may depend. When maximum reliability is the aim, therefore, a special policy on choice is desirable.

First, a critical and detailed examination is necessary to determine every electrical item essential to the reliability of the plant concerned; many electrical items may not be so implicated and the rigorous policy of choice suggested need not apply to these. Secondly, each of these selected items should be of the best quality obtainable, and a larger margin than usual should be allowed between the most severe conditions expected to obtain in service and the conditions the items are designed to meet. Finally, use should be made where practicable of what has been termed "judicious redundancy", *i.e.*, to duplicate parts if by so doing a significant increase in the reliability of the whole can be obtained.

In seeking maximum reliability, care in the overall detail design of plant is particularly necessary when more than one manufacturer is concerned in the supply of the parts, as these must not only be satisfactory in themselves but must also complement each other correctly. The co-ordination needed to achieve this may not be forthcoming unless a single authority is charged with this specific duty.

Efficiency

Fuel in an oilfield is likely to be virtually free, *e.g.*, gas that would otherwise be burnt off to waste, or at least very cheap. If this is the case, then the attainment of good efficiency can be subordinated to other factors such as reliability, simplicity of operation and maintenance, or low first cost, to an extent

*M.S. received 19 March, 1957.

†Chief Electrical Engineer, Fields and Pipeline, Iraq, Iraq Petroleum Co. Ltd.

that would normally be prohibitive in general practice. Where it is usual to use special materials, or employ relatively complex designs and ancillary equipment, it may be an advantage, in an oilfield, to avoid such measures. This can make it possible to choose plant and equipment which is more simple and reliable, and often less costly, than would be chosen by applying conventional standards of selection.

A lack of the usual need to emphasize efficiency can also make possible a greater than usual degree of standardization. Normally, it is uneconomic to use a larger size of, for example, transformer or motor than is necessary to meet each particular application. In an oilfield, however, one size of either can be adopted to cover a wide range of duties if the losses when used in situations where a smaller size would be adequate become of no practical importance.

Labour

It is often the case that an oilfield is in an area without local resources of skilled labour, and this labour will initially have to be largely imported and will then serve two purposes. One purpose will be to perform the work required, the other will be to train local labour to become skilled. Three conditions may, however, operate to keep indigenous skilled labour in short supply. These are normal wastage with time, a rising demand for more skilled labour as the field develops, and the increasing demand and opportunity for skilled labour outside the field as economic conditions in the country itself develop and improve.

It may be more than usually desirable, therefore, when selecting electrical equipment for use in an oilfield, to try and choose equipment that makes a minimum demand on skill for its maintenance, overhaul, and repair. Because it is quicker, it is sometimes unavoidable that labour should be trained in rule-of-thumb methods rather than by the inculcation of basic theory. Thus, equipment that is obvious in its principles of operation and construction is to be preferred in such situations.

Routine Testing

Even in a large oilfield the number of men available to carry out the more complicated routine electrical tests will be strictly limited, and any requirement to carry out a considerable programme of such tests may lead to their neglect. Equipment that requires such tests should therefore be avoided as far as possible. It is better to have in commission equipment that is known to be in good order as a result of simple routine tests rather than possibly more advanced equipment that is in doubtful order because the time and skill necessary to test it cannot easily be made available.

Generation

Capacity

In an oilfield there is likely to be only one main power source unconnected with any other source and, if this is the case, much may depend on the ability of this source to meet without interruption a given demand. Since each generating unit must at some time be out of commission for overhaul, freedom from interruption can only be guaranteed if there is always available one reserve unit and one for use while one unit is under overhaul. This means that to be reasonably certain of meeting reliably the full 100 per cent demand, there must be installed three units each of 100 per cent capacity, or four units each of 50 per cent capacity, or five each of $33\frac{1}{3}$ per cent capacity, and so on.

Given an estimate of probable ultimate demand required, and of its probable rate of growth, the practical ideal would appear to be to install three units initially, each rated at not less than $33\frac{1}{3}$ per cent of the expected ultimate demand, and make provision to add at least two more similar units in accordance with the growth in demand. This ideal plan will apply only if the load factor can be expected to be consistently high: in an oilfield this is likely to be the case.

Central Generating Plant

It is normally more important that oilfield generating plant should be capable of its full designed output reliably and continuously under the worst conditions likely to be experienced on site, than that it should achieve a good thermal efficiency. It is desirable, therefore, that the main plant itself, and its ancillary equipment, should be simple and generously rated. Steam-raising plant, for example, can be simplified by the omission of such usual items as economizers, air pre-heaters, and induced draught fans.

Since the consumption of auxiliary power is not likely to be of importance, forced or induced draught cooling towers may be found cheaper and more satisfactory than natural draught towers. Care is necessary to relate correctly the performance, under the worst site conditions expected, of the towers to the condensers of the turbines. The towers must not only be able to reject to the atmosphere the required amount of heat, but must also be able to do this between temperature limits of the cooling water, and at a flow that enables the condensers to achieve the desired performance with at least moderately dirty tubes.

Instrumentation can be directed solely towards easy and reliable operation and need not be concerned with efficiency, while accuracy of indication can to a large extent be subordinated to simplicity and robustness. It is worth while taking some trouble to eliminate unnecessary instrumentation. Failure to do this can lead otherwise to neglect and disregard of essential instruments.

Local Generating Plant

This may be required at remote sites, such as rigs or drilling camps, and will usually consist of diesel-driven alternators of from 15 to 100 kW site rating. These sets have an onerous duty. They may be required to operate at several different sites between overhauls and each move may entail transport over rough ground. Even if shelter is provided at the place of operation, which may not always be the case, they are likely to be exposed to the weather at other times. In service, skilled electrical maintenance or adjustment may rarely be available, yet the reliable operation of the sets, especially on rig use, may be important.

A major source of trouble with these sets has been found to be the failure due to vibration in service of instruments and of components, such as automatic voltage regulators. These failures seem to occur regardless of the use of anti-vibration mountings for control and instrument panels. A great improvement in reliability is effected if the panels are made so that they can be mounted apart from the set when it is in use, but anti-vibration mountings are still desirable to provide protection during transport.

If sets are ordered from standard commercial lines, the electrical equipment provided may not be adequate and it is therefore desirable to specify this in detail rather than accept what the maker normally supplies. Self-regulating alternators, especially if these are also inherently self-protecting,

are normally to be preferred, and static control or ancillary equipment is an advantage.

Three separate ammeters are preferable to the use of a single instrument with phase selector switch, as with the latter arrangement it is too easy to overlook unbalanced loading. A wattmeter is always desirable: this provides a direct indication of load on the prime mover and becomes essential for satisfactory parallel operation. It is an inexpensive and wise precaution to provide for this in the first place, even if the need to run in parallel with other sets is not contemplated in the original duty for which the set is required.

It is better if any circuit breakers associated with these sets are not oil-filled, and oil-filled devices, such as dashpots, should also be avoided. In the type of application concerned, oil may be lost in transport or may become contaminated in service without this being noticed. Oil-filled dashpots have the added disadvantage that they must either use special oil or their performance is too dependent on ambient temperature.

Transmission and Distribution

For most applications in an oilfield, for both transmission and distribution, overhead lines have the advantage over cables. They are lower in first cost, are cheaper and easier to install, and require less skill to repair. Their overload capacity is greater and, unlike cables, they are not liable to be permanently damaged through being subjected to overloads. Moreover, conditions in an oilfield are seldom static, and an overhead line network can be reinforced, modified, or extended with an ease and speed impossible with a cable network.

Overhead lines may be more liable to suffer faults than cables but the majority of such faults will be transient only. These will be unimportant on non-vital supplies and other supplies should in any case be duplicated. Automatic, or semi-automatic reclosing of breakers, where applicable, can often virtually abolish any nuisance due to overhead line transient faults.

Permanent faults on overhead lines are relatively rare, but when they do occur they can usually be found and repaired easily and quickly without the need for any special skill or equipment. Cable faults, however, are all permanent, and must always take some time and skill to repair; also, they can be difficult and tedious to find, even with special equipment, and the skill necessary to use it, immediately available.

Finally, with cable networks adequate mains records become essential, and the drawing office and site work that this involves is another disadvantage that does not apply to overhead lines. Even when such records are reliable and up-to-date, cables may be damaged by the excavation work that is likely to be a frequent occurrence in an oilfield. With buried cables it is often a case of out of sight, out of mind.

There are, of course, applications in an oilfield where cables are better than overhead lines, or are essential, *e.g.*, in gaseous areas, in congested areas with concentrated loads, or in stores yards where material handling operations may rule out the use of overhead lines.

Cables

When selecting cables it is well to remember that the larger sizes, besides being liable to be uneconomic, especially for short runs, are difficult to handle in the field. Normally, 0·25 sq.in. conductor is the largest size that it is desirable to use although, exceptionally, sizes up to 0·4 sq.in. may be justified, for example on relatively long high voltage cable feeders or to terminate overhead lines. For transformer connexions, if a single 3- or 4-core cable with 0·25 sq.in. conductors is not adequate, then a pair of such cables is usually preferable to the use of several single-core cables.

Paper-insulated multi-core pilot cables are better avoided unless there is a definite reason to use them; rubber-insulated pilot cables require less skill to install and are less susceptible to damage if they have to be disturbed.

Overhead Lines

Birds can be a source of frequent faults on overhead lines, especially on high-voltage lines, unless special precautions are taken. It is possible that many faults attributed to lightning are in fact caused by birds.

Birds can cause faults in two separate ways. A bird roosting on a crossarm immediately above a suspension insulator string can cause a flashover of the latter by means of its droppings. The remedy here is to prevent birds roosting in this position by fitting spiked guards to the crossarm above each suspension string. The second type of bird fault occurs when the bird flies into, or too close too, the gap between arcing horns. This type of fault seems to be confined to arcing horns on strain insulator sets, *i.e.*, arcing horns where the gap is horizontal and above the insulators. The remedy for this type of fault is to omit these arcing horns altogether.

Transformers

The modern transformer is a most reliable piece of equipment, but if it does fail it is likely to be out of action for some time: it will seldom be practicable to carry out repairs at the point of use. With essential supplies, therefore, it is advisable to duplicate any transformers concerned. With less essential, but still important, supplies it may be possible, in the event of the rare transformer fault, to accept the delay necessary to replace a unit without being able to accept the delay necessary to repair it. In such situations a single unit can then act as spare for a large number of units in commission. The greater the degree of standardization of size and type of units, and the easier it can be made by suitable design of substations to effect the rapid replacement of a faulty unit, the more valuable becomes this practice.

With large transformers it may be worth considering the use of single-phase units, since there will seldom be any lack of available space on site. This makes the individual units easier to transport and erect, and one single-phase unit can act as spare for a number of three-phase banks. Once a standard size has been decided upon, larger banks can be built up as load grows by parallelling units. These advantages may offset the higher first cost of single-phase units.

In general, a number of small transformers is to be preferred to a small number of large transformers unless the duty concerned is exactly known and is not likely to change. Where low-voltage (380-440-V) supplies are concerned, transformer ratings in excess of 500 kVA are seldom desirable except for unusually concentrated loads. Larger ratings raise the potential fault MVA, require relatively bulky and expensive switchgear and connexions, and result in unavoidably poor voltage regulation even if the load is distributed over a moderate area only.

A valuable item of equipment on almost any transformer is a temperature indicator with an additional pointer, that can be hand-reset, to indicate maximum temperature attained.

Motors

The many advantages of using squirrel-cage induction motors, particularly with direct-on-line starting, need no emphasis, and in an oilfield the size of the individual motor is not the bar to this practice that it often is in general use. An oilfield supply system may be able to accept with equanimity transient voltage disturbances due to motor starting that would not be permissible on a public supply system; also, such motors can be designed, if required, and at the expense of some loss in efficiency, to draw comparatively moderate starting currents, and in oilfield work this loss of efficiency is unlikely to be of any importance.

Where a number of motors is concerned there is much to be said for grouping together their starters or control switches. This usually makes for a neater and cheaper installation and, by saving space, can also reduce building costs; in gaseous areas further economies may be effected by a reduction in the amount of equipment that has to be of flameproof type.

Protection

Some General Considerations

High breaking-capacity fuses, where their use is applicable, have no rival for clearing faults. They are rapid and effective, cheap and reliable, and can usually provide any degree of discrimination required. Plain wire fuses are seldom satisfactory for any service. Their performance is unpredictable and they are very liable to abuse.

Fuses do, however, have two disadvantages. If they blow on a transient fault or on a simple overload, there must be some delay until they can be replaced, and if a single fuse blows it can leave a three-phase system fed on two phases only, and give rise to trouble, for example, with motors. But in some applications both these disadvantages can be overcome without resort to circuit breakers by using either repeating fuses or fuse-operated load-breaking isolators.

In any power system fed by a single source of limited capacity, as is likely to be the case in an oilfield, any fault on the main system, *i.e.*, that part of the system connected to the generation busbars without the intervention of either transformers or long feeders, must cause severe system voltage disturbance unless the fault is fuse cleared. A suitable fuse can clear a fault in less than a cycle but a circuit breaker will normally take several cycles from the moment its trip coil is energized. In these circumstances, there is little point in attempting to achieve very high-speed relay operation; system volt drop while the breaker operates, and the generator voltage recovers, is unavoidable.

However, it is necessary strictly to limit the duration of this system volt drop to keep to a minimum the number of motors that may trip out in consequence. In practice this means limiting discrimination between relays in series to not more than two or three steps. For example, with several substations on a ring it must be accepted either that one or more of these may lose supply if a fault on the ring occurs, or that pilot wire protection must be used.

The most severe faults will be those occurring on feeders leaving the power station, and without pilot wire protection the breakers controlling these feeders will normally have the longest fault-clearing times. On these breakers, therefore, pilot wire protection, if practicable, is a definite advantage.

With parallel feeders, directional protection is necessary if the advantage of automatic duplicate supply is to be obtained. If normal power flow is in one direction only, then this can be provided by directional over-current relays only, provided that these are specified to have sufficiently low settings and current transformers are not overburdened. This has the advantage of avoiding the use of directional earth fault relays, which require special voltage transformers and are difficult and inconvenient to test.

When parallel feeders supply a distant substation, and include overhead line sections that may be liable to suffer transient faults, automatic reclosing of the receiving-end breakers can be useful, especially if the substation is normally unattended. A simple method of effecting this is to use the line voltage that appears when the sending-end breaker is reclosed to initiate, after a short time delay, a reclosure of the receiving-end breaker. If the fault is not transient, the sending-end breaker will not stay in when reclosed and the time delay will ensure that the receiving-end breaker does not attempt to reclose.

Motors

Motor protection is a subject on which there appears to exist much difference of opinion and variety in practice.

In general, a motor will require protection against phase-phase and phase-earth faults, and against any over-current condition that might damage it; it may also require protection, in some cases, against loss of lubrication or loss of ventilation. The protection provided for a given motor should take into acount the particular duty and operating conditions of the motor; it is not necessarily enough to take into account its size and type only.

Fault protection should be as nearly instantaneous as practicable, and after such protection has operated it is usually better that it should not be possible to attempt to restart the motor until a specific action, such as resetting a relay or replacing a fuse, has been carried out by an authorized person. This avoids attempts by operators to restore normal conditions immediately after a fault trip; such attempts cannot always be prevented by operating directives and can result in unnecessary damage.

Proper over-current protection cannot be instantaneous as it must take into account both the duration and magnitude of the over-current. Thermal devices, if correctly selected, can do this; magnetic devices can do so only by incorporating timing devices, and even then they cannot protect, as a thermal device can, against intermittent over-current conditions such as may be caused by too many starts, or attempted starts, in a short time.

A further disadvantage of time-lagged magnetic over-current devices is their tendency, particularly with fully-loaded motors, to operate under conditions of transient system low-voltage before the conditions are severe enough, or have persisted long enough, to threaten damage to the motor. There may be many applications of motors in an oilfield where such unnecessary trips are particularly undesirable.

Unlike a fault trip, it may or may not be desirable for an operator to be able to restart a motor immediately after an over-current trip; this can be decided only by the particular application concerned.

After a total failure of supply, all motor breakers or starters, except in certain special cases, should trip automatically; if they do not, dangerous conditions may arise when supply is restored. This no-volt protection is normally inherent in contactors and can be fitted to circuit breakers; it should not be confused with under-voltage protection. The former is concerned with complete, or virtually complete, failure of supply, and may or may not be time-lagged. The latter is

concerned with a reduction in normal voltage that may be sustained. Under-voltage protection guards a motor against the over-current condition that may be caused by sustained low-voltage; it is not necessary if the motor has adequate over-current and no-voltage protection.

Instantaneous no-volt or under-voltage protection is usually an embarrassment in an oilfield, but many standard motor starters of the contactor type incorporate instantaneous under-voltage protection with a dropout voltage of about 80 per cent of normal. Where it may be difficult or inconvenient to fit delayed dropout to such contactors, it is advisable to specify the coils to be wound to hold in down to as low a voltage as practicable; preferably down to at least 50 per cent of normal. This will avoid unnecessary trips on all but the most severe system faults, and the over-current protection should take care of any sustained low-voltage condition.

However, such a condition on an oilfield system is likely to be rare compared with transient low-voltage. Therefore, if the choice lies between the motor tripping under each condition of transient low-voltage, or of it possibly being damaged by a condition of sustained low-voltage because of inadequate over-current protection, it may be better to accept the risk of damage and avoid unnecessary trips, especially with small motors.

Metering

In an oilfield, metering will seldom be required on the extensive scale that is usual in general practice; it will be exceptional for there to be any reason to meter most individual supplies. Usually, all that will be wanted will be to know, approximately, the maximum demand and total consumption of energy of various blocks of load of particular types, such as oil production, pumping, industrial, domestic, and so on. A knowledge of maximum demands is important when planning system extensions or when deciding what measures can be taken to meet special or emergency conditions.

Maximum demand and consumption are usually measured in kW and kWh, but from the point of view of permissible loading of almost all kinds of electrical plant the use of the units kVA and kVAh would be more logical and useful. As it is usually the permissible loading of plant that is of most interest in an oilfield, it is worth considering whether it would not be an advantage to use the kVA unit meters now available in most of the applications where it is usual to use kW unit meters. This would be logical even when energy is sold, since in an oilfield the cost of providing a given supply is likely to be more closely related to kVA demand and consumption than to kW demand and consumption.

Conclusion

Electrical energy is indispensable in a modern oilfield; there are applications for which no alternative exists and others where any alternative is not as good. But electricity, because of the wide scope of its employment and the ease with which it can be applied, can easily be misused or not used to the best advantage.

Some electrical practices and assumptions, valid in general, may not be so when applied to an oilfield, and recognition of this can avoid the unnecessary expenditure that can be incurred by the purchase of unsuitable plant, by avoidable interruptions of production, or by a maintenance and repair effort greater than need be.

Acknowledgement

The author thanks the directors of the Iraq Petroleum Co. Ltd. for permission to publish this paper.

Oil Research and Developments in Australia

Recently issued by the High Commissioner for Australia in the United Kingdom is an informative news letter on developments in oil search throughout that country.

Western Australia

The Bureau of Mineral Resources, Geology and Geophysics of the Australian Department of National Development is completing mapping of the Canning Desert, an area of about 125,000 square miles.

Associated Freney Oilfields N.L., an oil exploratory company, has reported "live oil" at 8,896 ft at Sisters Terrace about 60 miles south-east of Derby and drilling has been completed at 9,825 ft.

West Australian Petroleum is working at Samphire Marsh in the coastal area mid-way between Port Hedland and Broome, and at Meda, east of Derby. Drilling is planned on the coast of the Exmouth Gulf.

The Bureau of Mineral Resources is completing an airborne magnetometer survey in the Perth basin to investigate its general structure and delineate the eastern and western boundaries.

South Australia

Borings at Hedley, Victoria and in Queensland have yielded no gas or oil. Santos Ltd are investigating an area in the north-east corner of South Australia after discovery of natural oil slicks and grease in shallow water bores.

The Bureau of Mineral Resources is carrying out a seismic survey of the western part of the Great Artesian basin and an experimental underwater gravity survey of Port Phillip Bay.

Northern Territory

Geological and geophysical parties from the Bureau of Mineral Resources are surveying the Jervois Range area of the Northern Territory and the Georgina basin of north-west Queensland.

Papua

Australasian Petroleum Co. Pty Ltd have abandoned their Sitetu well near Kuru but drilling continues about 100 miles to the south-west.

The new laboratory was opened by Dr R. B. Killingsworth of Socony-Mobil Research Department

Mobil's New Technical Services Laboratory

A notable addition, both aesthetically and commercially, to the facilities at the Coryton refinery of the Mobil Oil Co. Ltd is the recent completion of the new Technical Services Laboratory.

It is a two-storey brick-faced building of contemporary design and of simple but pleasing appearance. It has a floor area of approximately 25,000 sq. ft. and a roughly U-shaped plan was chosen to facilitate expansion on either of the wings. A possible 50 per cent increase in staff is envisaged who could easily be accommodated on the present site.

The visitor entering the reception hall on the north side is immediately impressed by the excellence of the natural lighting, the use of bright colours for interior decoration, and the feeling of spaciousness.

A wide variety of floor finishes has been used, such as wood blocks for the offices and laboratories, terrazzo tiles for the entrance hall and stairs, quarry tiles for the CFR laboratory, and granolithic tiles for the engine test, process, and workshop areas.

Many of the party walls are prefabricated and demountable to allow flexibility of layout and none of these take more than one day to dismantle.

The functions of the laboratory cover product development, quality control, and technical service to markets, distributors, and manufacturers, and it carries out all the practical tests and experiments required. However, all fundamental research is conducted by the Research Department of the parent company, Socony Mobil Oil Inc. in New York.

The Coryton laboratory will provide on-the-spot data about automotive conditions of British cars that is valuable to motor importers in the U.S.A.

The laboratory will also handle adaptation and reformulation of new and existing products in Britain, and readjusting manufacturing specifications to the properties of the raw materials from supply sources, as was necessary during the Suez crisis.

Market needs alter—one instance being the increased popularity of vaporizing kerosine heaters—and products have to be reformulated to meet these new requirements. Much performance evaluation work precedes introduction of new products, and this is supplemented by tests in the manufacturing plant and at field trials.

Quality maintenance is ensured by co-operation between the Technical Services Department and the other groups in establishing suitable manufacturing specifications for the refinery and for the manufacturing and blending works at Birkenhead and Wandsworth. The laboratories enable the specifications to be met, and deal with samples of industrial and automotive lubricants, fuels, and greases sent in regularly from storage terminals and service stations throughout Britain.

The sample inspection laboratory

Assistance is provided on any field problem submitted by marketers and distributing companies and, finally, technical service is given to the Coryton refinery in assessing process variables on product quality by semi-pilot plant scale equipment, and in speeding up manufacturing control testing by development of analytical techniques.

The Technical Services Department

Manager of the Technical Services Department of Mobil Oil is G. A. Dickins, B.Sc., A.R.I.C., F.Inst.Pet. who, at the head office, has four co-ordinators (R. W. L. Fox, M.Inst.Pet.; R. W. W. Harp; T. Paterson, A.F.Inst.Pet.; H. F. G. Richards, A.M.I.Mech.E., A.F.Inst.Pet.) and an Office Group.

Superintendent of the Technical Services Laboratory is V. H. Rumble, F.Inst.Pet., and the organization of the Laboratory is in two divisions, sub-divided as below, and one main section:

SERVICES DIVISION (*R. M. Measures, B.Sc., A.F.Inst.Pet.*):
Analytical Development Group (*A. G. Woodman*).
Inspection Group (*J. R. Copeland*).
Office Groups.

PRODUCTS DIVISION (*F. J. Patman, B.Sc., A.M.Inst.Pet.*):
Grease and Allied Products Section (*W. Crawford*).
Lube Oil Section (*P. E. B. Vaile, A.M.I.Mech.E., F. Inst.Pet.*).
Fuels Section (*J. H. Boddy*).
Mechanical Testing Section (*L. H. Gardiner, A.F.Inst.Pet.*).

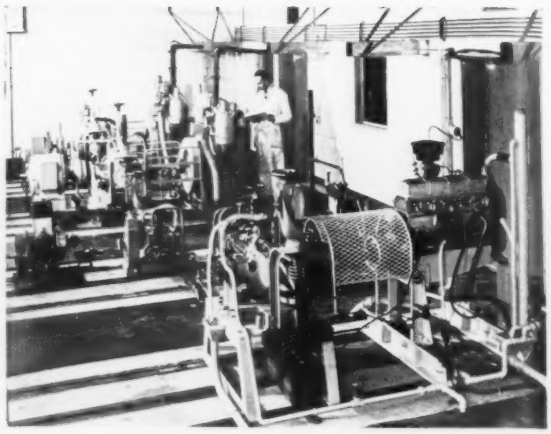
PROCESS SECTION (*J. Pearson, B.Sc., A.R.C.S., F.C.S., A.F.Inst.Pet.*).

The Formal Opening

The new Technical Services Laboratory was formally opened on 17 October, the chair being taken by J. C. Gridley, C.B.E., the Company's chairman. During his speech Mr Gridley said that for its extensive research and development work the Company relied upon Socony-Mobil, whose current research and development budget was about £7 million and who made available the results of their activities.

What would be done at the new laboratory was the application of the Socony-Mobil research and development to the needs of the markets which Mobil supplied. Assistance would also be given to the refinery in connexion with process problems and product quality.

Mr Gridley referred to the co-operation received from the contractors for the building, Messrs John Laing & Sons Ltd.



Engine test beds at Coryton

He also expressed appreciation of the staff housing facilities provided through the Basildon Development Corporation.

Inviting Dr R. B. Killingsworth to perform the opening ceremony, he said that Dr Killingsworth had come specially from New York to do so. He had been in charge of the Technical Department from July 1952 until his return to the United States in December 1955, bequeathing to his successor an approved capital appropriation for the building now to be formally opened.

Dr R. B. Killingsworth, accepting a golden key from Mr Gridley, said he was pleased and honoured to perform the ceremony for two reasons. First, because he had played a part in its planning and knew what the laboratory meant to the Technical Services Department. Secondly, and mainly, it was because the new installation was a recognition of the importance of technical laboratory activities in the U.K. as part of the overall Socony-Mobil research and development programme.

He said that Mr Lamont, Socony's director of research, sent his congratulations to Mobil Oil Company Limited on this occasion.

Dr Killingsworth then opened the door of the new laboratory amid applause.

COLLIERY METHANE FOR WEST MIDLANDS GAS BOARD

Some methane gas from local mine workings is now being used instead of coal for part of the industrial and domestic supply in the Stoke-on-Trent district. It forms the first stage of a joint scheme by the West Midlands Divisional Coal Board and the West Midlands Gas Board. By the middle of 1958 it will save about 1000 tons of coal a week.

In the first stage a minimum supply from two collieries equivalent to 5,000,000 cu. ft a week of pure methane is envisaged which will equal 19,000,000 cu. ft of coal gas.

Four schemes for drainage of methane have been, or are being, undertaken in North Staffordshire. The first began at Stafford Colliery in 1950, and was developed in the Bowling Alley seam, one of high quality. The gas, which is still being drained has been used for firing boilers and in an experimental gas turbine for generating electricity. It will soon be augmented by supplies from Hem Heath Colliery where drainage is also being applied successfully. In addition to the supply from Wolstanton Colliery, the Coal Board will make available in about mid-1958 to the West Midlands Gas Board gas drained from Holditch.

The quality of the gas drained by boreholes and from old workings varies between 55 per cent and 95 per cent methane. In terms of coal equivalent the minimum 5,000,000 cu. ft in the first stage will represent a saving of 700 tons of coal a week.

Around the Branches

BAHRAIN, ESSEX, FAWLEY, KUWAIT, LONDON, NORTHERN, SCOTTISH, SOUTH-EASTERN, SOUTH WALES, STANLOW, TRINIDAD

Chairman of the London Branch with (left) *Gerald Walsh and* (right) *J. Pierret*

Among those present at the London Branch Theatre-Dinner Party were: J. Pierret, Garry Richardson, J. H. M. Clark, Alan Richardson, M. R. Holmes—

W. H. Davies, Mrs Worcester, Mrs Davies, and A. T. Worcester—

London Branch Theatre-Dinner

On 4 October the London Branch of the Institute made an important innovation in its programme of social activities when it held a theatre-dinner function. The success of this is best judged by the fact that at least 50 members of the Branch and their ladies attended and the general impression is that without exception all enjoyed the evening. The theatre chosen was the Victoria Palace where the famous group of entertainers known as the Crazy Gang were carrying on their traditional type of entertainment which has been popular in London for very many years.

Following the theatre show there was an excellent dinner at the Victoria preceded by a session at the bar and followed by a similar session until the fear of missing last trains loomed in the minds of many of those present. During the dinner the chairman of the Branch, Ron Leach, made a commendably brief speech referring in

Mr and Mrs D. M. Watson and Mr and Mrs F. Clode—

Mrs C. W. S. Collins, Mrs Loweth, H. E. Richardson, P. H. Loweth, Ashley Carter (whose father will be remembered as IP Honorary Secretary for many years), and Mrs Carter

particular to the development of social activities within the Branch. He referred especially to the film show which would be held in December, to the luncheon meeting in March, and also to the dinner debate in January. These were events which members should note.

He particularly welcomed Gerald Walsh, of Caltex (Africa) Ltd, Durban, who on the previous Saturday had won the London to Brighton Running Race in the record time of 5 hours 26 minutes 20 seconds. It is of interest to record also that on 19 October Gerald Walsh established two new world records at Walton-on-Thames —40 miles in 4 hours 4 minutes 34 seconds and 50 miles in 5 hours 16 minutes 7 seconds. The chairman also welcomed J. Pierret of the Belgian Company "Labofina" who was on a visit to London and had been brought to the meeting by one of his colleagues. Concluding, the chairman said he was also pleased to see so many members and their ladies present and expressed the hope that they had enjoyed the evening's entertainment and would continue to do so in the adjoining bar.

Scottish Branch

A meeting of the Branch was held in the Recreation Hall, BP Refinery (Grangemouth) Ltd, on 17 October, when Dr G. H. Smith, M.C., (Hon. Treasurer) who was in the chair, introduced P. S. Carnt who gave a lecture on Colour Television. Mr Carnt was assisted by a colleague, Mr Townend.

In colour television the trichromatic property of vision was used, *i.e.*, by employing only three coloured lights, red, green, and blue, a full range of tints was obtained.

Such a system however required three times the band width of the monochrome transmission.

An American method operated by the National Television System Committee required only one and a half times the band width because of a combination of band width saving and sharing.

Many different tests had been made, one of the most promising being a single gun device which, working on the principle of feedback, made the tube select a colour as a function of the scanning beam position.

After the lecture much interest was shown in the apparatus on display. The lecturer answered several questions and, on the call of the chairman, Mr Carnt and Mr Townend were accorded a vote of thanks.

Stanlow Branch

A joint meeting of the Stanlow Branch with the Preston Branch of the Royal Institute of Chemistry was held in Morecambe on 27 September 1957. The chairman, M. Willcocks, who took over from C. N. Thompson, introduced Dr W. M. Mazee of Koninklijke Shell Laboratorium, Amsterdam, who presented a paper on "Physical and Chemical Properties of Petroleum Waxes".

Dr Mazee first dealt with normal commercial waxes and properties such as transition point operation and modulus of rigidity and stated that the latter gave better information about some mechanical properties of the wax than the former.

He discussed adduct formation, in which a straight chain wax forms a complex with urea, but the procedure could not be used for dewaxing since it did not take out branched chain hydrocarbons. It did however give the possibility of approximate analysis of straight chain hydrocarbons in commercial paraffin waxes.

Dr Mazee considered the reactivity of wax towards oxygen with the probable formation of fatty acids, and concluded with a study of microcrystalline waxes.

After a lively discussion the vote of thanks to Dr Mazee was proposed by Mr Edmonson of the Royal Institute of Chemistry.

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STUDENT MEMBERS

The Council of the Institute have decided that as from 1 January 1958 Student Members will receive the *IP Review*, as well as the Journal, for the same annual subscription of £1 1*s*.

The Council are most anxious that young men, who are contemplating a career in the oil industry, should want to join the Institute of Petroleum, and all members are asked to bring the advantages of such membership to the attention of young men in the companies.

Anyone (of either sex) who is over 17 and not yet 23, and engaged on a course of study connected with petroleum—and this can be either at a University and college or a company training scheme—is eligible to join as a Student Member, at an annual subscription of £1 1*s*. and without entrance fee.

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MAGNETIC INTENSITY AIR SURVEY

Data from a new 7410-mile magnetometer profile flight, from Malaya to England, are being studied by the geophysical staff of Aero Service Corpn., Philadelphia. The record was made in May 1957 with a Gulf airborne magnetometer at an average flight altitude of 3000 ft.

The study began at Kuala Lumpur and the route covered Rangoon, Calcutta, Delhi, and Karachi. Bahrain was the next stop, and the survey continued to England via Damascus, Athens, Rome, Nice, Orange, and Lyon.

It is believed that analysis of the data obtained may contribute knowledge of the structure of the earth's subsurface in both sea-covered and land areas, and aid search for petroleum and mineral areas.

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MIDDLE EAST PRODUCTION

	Tons	
	Sept.	*Jan.–Sept.*
Iraq Petroleum Co. Ltd ...	1,480,610	7,534,646
Basrah Petroleum Co. Ltd ...	776,593	6,307,995
Mosul Petroleum Co. Ltd ...	66,673	341,826
Qatar Petroleum Co. Ltd ...	596,396	4,722,758
Iraanse Aardolie Exploratie en Productie Mij	3,061,000	25,804,000
Kuwait Oil Co. Ltd	5,203,706	41,273,727

The refinery throughput at Abadan of the Iraanse Aardolie Raffinage Mij for September was 1,297,000 tons, the total for 1957 being 11,751,000 tons.

Gas Council May Import Liquid Methane

The Report for 1956-7

In its report for the year ended 31 March 1957 the Gas Council records that the North Thames Gas Board, on behalf of The Council, has been surveying the possibility of importing natural gas in the form of liquid methane. Liquefaction reduces the volume to 1/600th of its volume as a gas but involves reduction of its temperature to —161·5° C (—258·7° F) and maintenance at that temperature during transport.

The technical problems of liquefaction appear to have been solved and those of storage and transport are well on their way to solution. The possibility of importing a trial cargo is under consideration. At the Press Conference when the report was issued Sir Henry Jones, M.B.E., deputy-chairman of the Council, said that a 3500-ton tanker was being converted in the U.S.A. to carry about 2000 tons of liquid methane. He anticipated that the first experimental cargo would reach the U.K. in about 18 months time.

Allowing for conversion to a normal calorific value of 500 B.t.u/cu. ft., one ton of liquid methane would give 475 therms, compared with 185 therms from a ton of coal as gas, coke, and tar, and 225 to 310 therms from a ton of coal used for gasification.

Methane from Coal Mines

Methane from the Point of Ayr colliery, North Wales, was first supplied on 16 April 1956, the quantity of 1·1 million therms to the end of March 1957 being smaller than expected due to delays in the mining development programme. The methane is reformed by two processes—one catalytic in an Onia-Gegi plant and the other thermal in a water-gas generator.

Arrangements have also been made for the purchase of methane from collieries in England and in Scotland.

Search for Natural Gas

On the subject of the search for natural gas in the U.K., which was being undertaken by the BP Exploration Company on behalf of the Council, the report says that the well at Fordon, near Scarborough, was completed at 7559 feet. Gas was found but not in commercial quantity.

The new well at Cousland, near Dalkeith, failed to prove the extension of the field and it was decided to re-open the original well in which gas had been found before the war. A pipeline has been laid to Musselburgh where the gas will be mixed with gas made there.

Gas has been found at Crowborough and Heathfield, in Sussex, but not in commercial quantities. Small finds have been made in other areas and may be used to augment local supplies of town gas.

Oil Gasification

Plants for oil gasification are being operated by various Area Gas Boards and three processes—two catalytic and one non-catalytic—are employed. Other Boards have been recommended to install catalytic plants in order to gain experience. At 31 March fourteen oil gasification plants were in operation, and twenty-five more were under construction or on order. When completed, the total capacity of these thirty-nine plants will be 113 million cubic feet of gas daily, their annual oil consumption about 338,000 tons, and the saving of coal over a million tons a year.

The quantities of oil used and the amount of gas made therefrom during the last four years are set out below. But for the restrictions on oil supplies the quantities for 1956–57 would probably have been greater.

	Gas oil or diesel oil used	*Heavy oil used*	*Total oil used*	*Oil gas made*
	gallons	gallons	gallons	therms
1953–54	329,200	1,932,500	2,261,700	1,924,500
1954–55	716,800	3,591,600	4,308,400	3,920,300
1955–56	701,200	4,212,700	4,913,900	4,594,800
1956–57	1,271,900*	4,572,500	5,844,400	5,325,700

*Includes 1,241,500 gallons of light oil distillate

Oil Refinery Gases

Good progress was made in the installation of plant and mains for taking tail gases from Fawley (Esso Petroleum Co. Ltd) and Shellhaven (Shell Refining Co. Ltd) refineries. Agreements made provide for ten years and an annual supply of 25 million therms from Shellhaven and 17 million from Fawley.

Hydrogenation of Oil

Hydrogenation of petroleum is now regarded as a promising process for the production of gases and a 7·5 million cubic feet per day experimental plant is to be erected by the North-Western Gas Board. The ultimate aim is coal hydrogenation, but the use of oil as a raw material facilitates the study of chemical engineering problems.

A one-million cubic feet per day pilot plant is to be erected at Solihull to explore the hydrogenation process over a wider range of oils.

There is also need for a process to gasify any petroleum fraction, and particularly heavy oil, at normal pressures. A process has been developed depending on a homogeneous reaction between oil and superheated steam and a one million cubic feet per day plant is being erected in the North Thames Gas Board area.

Benzole

During the year 28,550,000 gallons of crude benzole were extracted by the Area Gas Boards, 291,000 gallons less than in 1955–56. The quantity refined was higher at 13,019,000 gallons compared with 12,355,000 gallons.

Personal Notes

P. C. Brooks

P. C. Brooks, Division Manager of Mobil's Midland Industrial Division in Birmingham, has completed 40 years' service with the Company. At a small dinner party held in the Chesford Grange Hotel, Kenilworth, he received a gold watch from C. Lawrie, director responsible for Mobil's Industrial Sales.

Mr Brooks' service has been spent almost equally in South Wales and the Midlands. For his first 11 years with the Company he was employed in the office before becoming a salesman in South Wales. In 1936 Mr Brooks moved to a similar position in Birmingham and became acting branch manager in Sheffield for a short time. In June 1952 he returned to Birmingham as the manager of the newly formed Midland Industrial Division.

W. E. Eadie

W. E. Eadie has been thirty-six years with the Burmah Oil Company, which he joined as a chartered accountant in 1921, going to Burma the same year.

In 1928 he was transferred as chief accountant to Burmah-Shell Oil Storage and Distributing Co. of India Ltd in Calcutta. In 1941 he was transferred to Burmah Oil Company's head office in London, and became chief accountant in 1948. In 1950 he joined the Board of Burmah Oil as an executive director, being appointed assistant managing director in 1951. He became managing director of Burmah Oil in 1955, and has now been appointed chairman in succession to Sir Kenneth Harper.

In 1955 Mr Eadie was appointed to the Board of The British Petroleum Company.

Dr Alex G. Ablad

Dr Alex G. Ablad has been elected a vice-president in charge of Research and Development activities of the M. W. Kellogg Company, New York, a subsidiary of Pullman Incorporated.

Prior to joining M. W. Kellogg, he was vice-president in charge of Research and Development and on the Board, Houdry Process Corporation, Philadelphia. His responsibilities at the same time joined him with the expansion of the Catalytic Construction Company, a Houdry subsidiary. Earlier he was associated with the Texas Research Foundation, the Magnolia Petroleum Company, and The Standard Oil Company (Indiana).

W. L. Coats

W. L. Coats, B.Sc.(Eng.), A.M.I.Mech.E., A.F.Inst.Pet., who retired from Shell-Mex and B.P. Ltd at the end of May after thirty years with the Company, has joined the teaching staff in the Department of Mechanical Engineering of Glasgow University.

In the Institute, which he joined in 1947, Mr Coats was particularly active in the work of Standardization Sub-Committee No. 1 on Measurement and Sampling. He was chairman of the Calibration of Tanks Panel from 1949, having been a member from 1948. In 1947 he joined the Panel on Units of Measurement, Calculations, and Tables, and was its deputy chairman from 1949 until he retired. It was the latter Panel which was largely responsible for the British work which led to the publication of the "ASTM IP Petroleum Tables". Mr Coats was also the author of an authoritative article on "Calibration of Cylindrical Tanks with Axis Inclined" which appeared in the *IP Journal* in 1948.

Herbert Rich

Herbert Rich, District Manager in Mobil's South Midland Automotive Division in Birmingham, has become Manager of the Company's North Midland Automotive Division in Sheffield. **S. F. G. Mann,** the previous Manager of this Division, has been transferred to London as assistant to **F. P. Barribal,** director, and will be based on the Company's Head Office at Caxton House, London.

Mr Rich joined Mobil in 1928 and worked in the Bradford office for 3 years before moving to Sheffield, first as a sales assistant and in 1937 as a salesman. He held this post until 1952, apart from a break caused by the war.

In 1952 he became a salesman in the newly formed Midland Automotive Division and in 1956 he was appointed district manager.

P. R. Wragg, who joined the Company in 1932, succeeds Mr Rich. Since 1956 he has been a retail training instructor, for the most part at the new retail training centre at Denham.

F. F. H. Halestrap has resigned his position as a director of Dewrance & Co. Ltd, after more than 59 years' service with the Company.

J. W. Plowman and **D. Handley** have been appointed directors. Mr Plowman is also chief executive assistant to **J. M. Storey,** managing director and Mr Handley is manager of the Company's Dumbarton Works.

A. S. C. Hulton

A. S. C. Hulton, A.M.Inst.Pet., managing director of Shell Tankers Limited, has recently been appointed a director of Shell Petroleum Company.

Our congratulations to **C. E. R. Sams,** F.C.G.I., Hon. M.I.Mech.E., M.Inst.Pet., who celebrated his 80th birthday on 26 November. A member of the IP since 1927, Mr Sams has long been a notable figure in the petroleum equipment industry through his long association of 29 years with George Kent Ltd, and for his work in connexion with the Council of British Manufacturers of Petroleum Equipment, in the formation of which he and T. L. Bonstow collaborated. Retiring from Kents at the age of 70, he then took up a position with Elliott Brothers Ltd and is still connected with them.

A Founder Member and now an Honorary Member of The Society of Instrument Technology, Mr Sams was also instrumental in initiating the meeting which the City and Guilds of London Institution held to discuss the education of the instrument maintenance artificer. As a result of that meeting there is now a chair of Instrument Engineering.

One of his principal efforts over many years has been to advocate the necessity of not wasting coal. One activity in this direction, to which we referred recently in our columns, was the design of an aerofoil flow meter which permits flow to be measured without any loss of pressure.

Mr Sams has always been critical of the manner in which the experience of years is lost when qualified men are compelled to retire at a comparatively early age. In this direction he has, by his own personal effort, found scope for the re-employment of that experience to the mutual advantage of the men and the companies concerned.

Recently, Mr Sams was made an honorary member of the Oil Industries Club.

He is also an Honorary Fellow of the Imperial College of Science and Technology and an Honorary Member of the Institution of Mechanical Engineers.

We join his many friends in wishing him many more years of activity.

G. W. Powell

G. W. Powell, formerly general manager (Marine) has been appointed a director of Esso Petroleum Co. Ltd.

Mr Powell was educated at Charterhouse and Cambridge University.

He joined the Company in 1923 and after appointments on the marketing side in Oxford and Southampton, became divisional manager of South Western Division in 1939. From the outbreak of war until 1948 he served with the Petroleum Board as manager of the South West Region.

In 1950 he moved to Head Office as assistant general sales manager, and in 1952 became co-ordinator of shipping and supplies.

When the Marine Department of Esso Petroleum Co. Ltd was reformed in 1954, Mr Powell was appointed general manager (Marine).

Mr Powell on his appointment as director continues a long family association with the Company. His father, the late F. E. Powell, was chairman of The Anglo-American Oil Company Ltd (as the Esso Petroleum Company was then known) from 1912 to 1931.

United Steel Companies' Appointments

A. J. Peech, deputy general managing director of The United Steel Companies Ltd, has been appointed general managing director, in succession to the late **Gerald Steel.** A member of the executive committee of the British Iron and Steel Federation, Mr Peech is also a director of the trading companies, British Iron and Steel Corporation Ltd and B.I.S.C. (Ore) Ltd.

A. J. Speakman, deputy director of the British Productivity Council, has been appointed work study manager in United Steel's operational research and cybernetics department. Mr Speakman has had many years' experience of production engineering and work study and for a three-year period was work study manager of the general chemicals division of Imperial Chemical Industries Ltd. Before joining the British Productivity Council in 1953, he was in private practice as a work study consultant.

Mr Speakman's appointment completes the team of five departmental managers in United Steel's department of operational research and cybernetics which is headed by **Stafford Beer.** Appointed earlier this year were **R. S. Gander,** development manager; **P. G. Lucas,** operations manager; **D. G. Owen,** computer applications manager; and **Dr K. D. Tocher,** research applications manager.

The British Internal Combustion Engine Research Association

At the Annual General Meeting the Rt Hon. the Viscount Falmouth was re-elected president of the Association. Sir Harold Roxbee Cox and Professor O. A. Saunders were re-elected vice-presidents. Vice-Admiral N. E. Dalton (Engineer-in-Chief of the Fleet), H. N. Pemberton (Chief Engineer Surveyor, Lloyd's Register of Shipping), and Brigadier S. A. Stewart (Director, Royal Engineer Equipment, Ministry of Supply) were also elected vice-presidents.

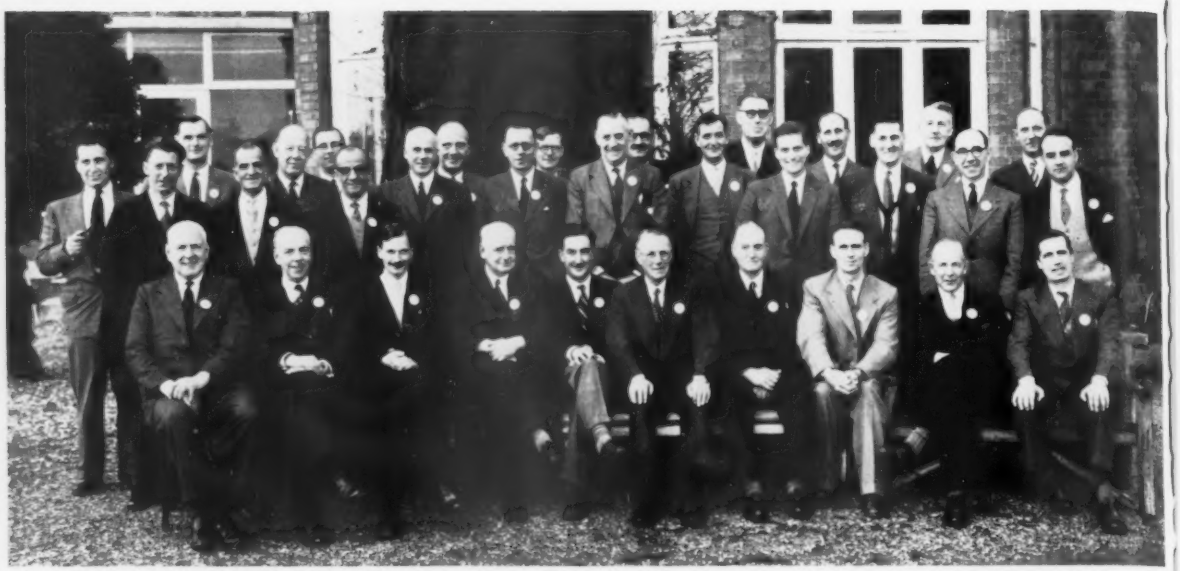
B. D. Giordan and C. G. Tangye were elected to the Council in succession to J. Calderwood and V. H. Hopkins.

A. C. Yeates has succeeded G. W. Bone as Chairman of Council, and Mr Giordan has been elected vice-chairman.

U.S. University Appointment for British Scientist

The International Nickel Co. Inc. has established a Chair in Chemical Metallurgy at Columbia University to be known as the Stanley-Thompson Chair of Chemical Metallurgy.

The first incumbent is Dr J. H. Schulman, Fellow of Trinity Hall, Cambridge and Reader in Surface Chemistry. Dr Schulman, a vice-president of the Royal Institution and the Faraday Society, was a scientific adviser to the Ministry of Supply during the war.



An Associated Ethyl photograph

The second SOMA Safety Conference

Stanlow Oil Managers' Second Safety Conference

Readers of the IP Review will recollect[1] that SOMA (Stanlow Oil Managers' Association) broke new ground last year in organizing an inter-refinery safety conference. The response then shown was felt to justify a repetition and the second safety conference arranged by the Association was held on 22 October 1957. The venue was the Mollington Banastre Hotel, on the outskirts of Chester, and an increase in attendance on last year's figure was recorded; in addition to members of staffs of companies represented on SOMA, delegates were also present from the Central Electricity Authority, Imperial Chemical Industries Ltd, the Manchester Ship Canal Company, and the valuable support of representatives of H.M. Inspectorate of Factories was, as on the previous occasion, also given.

The delegates and speakers were welcomed by J. S. Parker (Lobitos Oilfields Ltd) the chairman of the Association, who then handed over to J. C. Cragg (C. C. Wakefield & Co. Ltd) who occupied the chair for the remainder of the conference.

Size and Safety

The first speaker was Professor R. W. Revans of the Department of Industrial Administration at the Manchester College of Science and Technology, who took as his subject "Management Structure and Industrial Morale: Accidents, Absenteeism, and Disputes". In a most instructive examination of human behaviour patterns, based mainly on his experience with the National Coal Board, Professor Revans showed how accident rate follows a size law, the risk of injury to a worker in an undertaking being proportional to the logarithm of the size of the undertaking. The law applied to circumstances as far different as those of underground workers in British pits and nurses in American hospitals. A similar size relationship applied in the case of absenteeism, sickness, and strikes. It could thus be concluded that accidents are social events governed by the attitude, conscious or unconscious, of an individual to the group to which he belongs; a conscious desire to withdraw from the group leads to a strike or absenteeism and an unconscious desire to withdraw results in increased accident frequency and sickness.

The same pattern was to a certain extent repeated within an undertaking inasmuch as the size of the working group was a major factor in deciding the accident frequency rate. A supervisor had to allocate his time between supervision and co-ordination and, if the group was too large, the former activity tended to predominate over the latter and more accidents resulted.

The effect of the attitude of management was strikingly demonstrated by a comparison of accident rates in two groups of technically closely similar collieries, which, subsequent to nationalization, were divided among two management districts, leading to a marked divergence in accident rates. In effect the different results under the different managements reflected a problem of communication in which factors such as approachability, awareness of detail, and the remoteness of the ultimate decision level all played an important part.[2]

Importance of the Foreman

Following a discussion on Professor Revans' address the second talk was given by E. R. Harding (Safety Officer, Associated Ethyl Co. Ltd) who took as his subject "The Foreman and his Safety Responsibilities". Mr Harding pointed out that the "foreman" (for whom he had collected

over 160 titles, ranging from "overlooker" to "undermanager") was the member of management in *direct* control of labour. The significance of accidents tended to be understated; in 1955 five times more time (20 million man-days) was lost by accidents than by strikes, but the latter got most of the press publicity. Mr Harding's lecture was high-lighted by his skilful use of vivid visual aids, not least of which was the sudden display of 230 £1 notes on the lecture table, to indicate the cost to the nation of accidents during the 10 seconds it took him to explain the significance of this sudden display of "the lolly".

In the speaker's view, both managerial and personal responsibility (a term defined by Mr Harding as "the state of incurring the consequences of an act") were involved in accident prevention; spheres of responsibility should be defined and full scope allowed within such spheres. There was no clash between production and safety targets and, on the subject of training, he adopted Ruskin's dictum that "education does not mean teaching people to know that they do not know; it means teaching them to behave as they do not behave".

After this talk, the delegates divided into three groups for discussion on the two papers. This was followed by lunch and the afternoon began with a general consideration of the group reports, which were presented by the group chairmen. The main general conclusion which emerged from the discussion was that a major problem of industry today was the selection of suitable persons to be foremen, especially in view of the key position of such individuals in any accident-prevention programme.

Fresh Thoughts on Accident Statistics

The final paper was by R. E. Tugman (Divisional Safety Officer, Alkali Division, ICI Ltd) on "Some Thoughts on the Assessment of Accident Prevention Performance".

Mr Tugman's thesis was that although it is essential to have accident statistics, most of such data obtained today are misleading, as they are *injury* rather than *accident* statistics; unless someone gets hurt, it is not an accident and hence does not get reported. The present tendency to have accident-prevention competitions was one against which the speaker resolutely set his face; such competitions gave a false picture and in many cases industrial accidents were ascribed to a non-industrial cause, to avoid spoiling an "accident-free" record. Statistics were also affected by the attitude of the doctor concerned, both in attributing a cause to the injury and in deciding when the victim was fit to resume work. Not sufficient account was taken of the "near miss" incident and the reporting of unusual and potentially dangerous occurrences by foremen should be encouraged. Mr Tugman thought that the basis of accident statistics should be revised so as only to take into account fatal and serious accidents and those leading to at least 3 days (or shifts) lost time and, in this connexion, the payment of industrial injury benefit should not necessarily be taken as evidence of a "recordable" accident.

In the discussion following Mr Tugman's paper, attention was drawn to the obligation which to a certain extent already exists today, but in a more limited field to that he envisaged, to report "dangerous occurrences".[3]

Final Remarks

The work of the conference was summed up by A. Cluer (Lobitos Oilfields Ltd) who interspersed his remarks by apt playbacks of passages from the tape recording (provided by the courtesy of Associated Ethyl Co. Ltd) made during the conference. Among the points stressed by Mr Cluer was the necessity of designing for safety, especially when planning a plant to operate a new process, and the assistance that could be gained from the use of models in deciding plant layout.

The conference concluded with the expression of thanks to the speakers and appreciation of the work done by the safety sub-committee of SOMA and the Honorary Secretary of this sub-committee (G. W. Power, Lobitos Oilfields Ltd) in planning and arranging the conference.

Judging from the interest expressed by delegates and the thought-provoking ideas put before them, it is safe to predict that this second SOMA safety conference will not be the last.

[1] See *Inst. Petrol. Rev.*, 1956, **10**, 325.
[2] Readers interested in a fuller account of Professor Revans' work on the size factor in industry are referred to his paper, "The Analysis of Industrial Behaviour", at the conference of the Institution of Production Engineers (Harrogate, July, 1957).
[3] Factories Act, 1937, s.65, and Dangerous Occurrences (Notification) Regulations, 1947 (S.R. & O. 1947, No. 31) made thereunder.

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Funnel of the Future

The new type of funnel now being adopted for all new ships of the BP Tanker Co. Ltd

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U.K. OIL PRICE CHANGES

With effect from 13 November the U.K. wholesale prices of motor and aviation (excluding 73 octane) spirits were reduced by $\frac{3}{4}d.$ per gallon, of Avtur by $\frac{3}{4}d.$ per gallon, Avtag by $\frac{1}{2}d.$ per gallon, derv fuel by $\frac{1}{2}d.$ per gallon, kerosine and vaporizing oil and domestic fuel oil by $\frac{1}{2}d.$ per gallon.

A Century and A Quarter of Valve Manufacture

The firm of Sir W. H. Bailey and Company Ltd, an IP Member-Company, this year celebrates its 125th anniversary, having been founded in 1832 when John Bailey first went into business in a small cottage in Salford. His son William, who took over in 1865, was one of the original promotors of the Manchester Ship Canal and he was knighted by Queen Victoria on board the first ship to pass through the canal. The family is still represented on the board of directors, the chairman, Denis L. A. Bailey, and the managing director, Donald Bailey, being great-grandsons of the founder.

In connexion with the anniversary celebrations, members of the technical press were recently shown around the Company's works at Patricroft, Manchester, on the site of which the Company's foundry was first erected in 1885. Since world war two, the purchase of adjoining land and the erection and equipping of new buildings has resulted in a works which are as up-to-date as any.

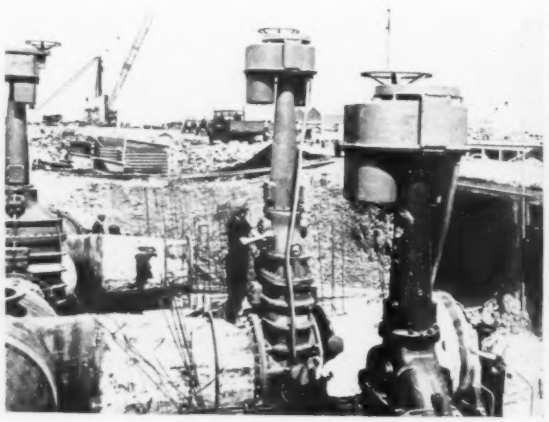
36-inch Bailey valves being installed at the Kuwait distillation plant.

In the petroleum industry, the firm of Sir W. H. Bailey and Co. Ltd is well-known for the large variety of valves and pumps which it supplies. These include sluice, reflux, and reducing valves for all pressures and types of drive, modified if necessary to suit the requirements of oil refineries. Large cast steel valves of 12 inches and over to BSI standards are also furnished to the petroleum industry, as well as core extractor pumps.

In commemoration of the anniversary, the Company has issued a booklet entitled "A Guide to Valve Practice". Until 1908 the Bailey "Useful Inventions for Engineers" had been a standard reference book for at least forty years. The present volume is an endeavour to continue that service by providing a book which will enable engineers and buyers to specify quickly the valve they require.

Apart from the valves listed in this publication there is a section on interesting products, which reminds the reader that in addition the Company has in the past supplied a very considerable variety of equipment. For example, mention is made and an illustration given of the Bailey "Thurston" oil tester.

One exhibit shown during the visit was a copy of a catalogue of "Oil Testers" published in 1924. In this details are given of various patterns of "Professor R. H. Thurston's Oil Tester for oils, greases, bearing metals, etc". This consisted of a pendulum hung from a bearing on a shaft rotated by means of a pulley. Pressure on the bearing brasses was applied by a spiral spring and regulated by a screw. When the shaft was set in motion, the friction caused the pendulum to move from the vertical, the angle of deviation and the pressure on the bearing giving a measure of the coefficient of friction. The tester could also be used to determine liability to gum, and durability.



48-inch valves at the BP Isle of Grain, Kent, refinery.

Other machines made by Baileys were the Ingram and Stapfer oil tester. Boult's patent tester for testing cylinder oil at working temperatures, and Nasmyth's warm glass test for fluidity testing.

Other products which the firm have manufactured include a hydraulic organ blower, a patent beer raiser, a bell chiming machine, a lightning conductor, and a boot and shoe cleaning machine.

Among the present-day "other products" of the Company are hydraulic and ram pumps, gauge testers, turnstiles, and coin-operated installations.

Speaking at the luncheon during the visit, Donald Bailey said that the Company was virile and energetic and was now engaged in a field of activity which, although narrower than in its earlier days, was an extremely useful field of engineering practice in the United Kingdom. Recently three members of the firm, two directors and one fitter, had visited the United States to study methods there.

Notes of the Month

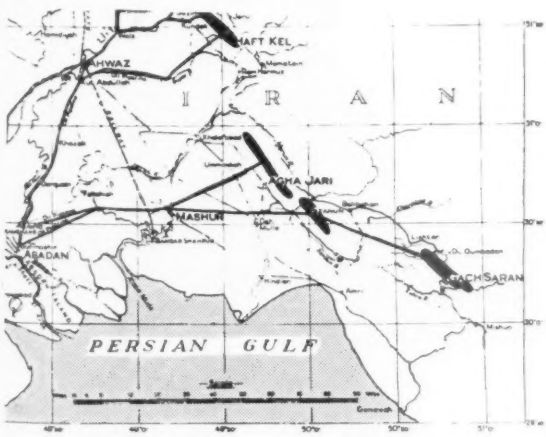
Oil Consortium Budget for South Iran

Projected expenditure of £50,000,000 by the Iranian Oil Operating Companies in their Agreement area of South Iran has been approved by the international Consortium. Of this total, £19,000,000 is earmarked for development of facilities to handle increased production from the Gach Saran oilfield, which lies in the centre of the area 150 miles due north of Bushire and about 50 miles from the Persian Gulf. These facilities include roads, airstrips, housing, offices, and clubs, but the main items will be a new pipeline from Gach Saran to the coast and a new loading port equipped to handle the largest tankers now built or under construction, of upwards of 100,000 tons.

Water pipelines between Godar Lawdar and Gach Saran

The budget also provides for a substantial increase in output of the Agha Jari oilfield and construction of a new pipeline to the present crude oil loading terminal at Bandar Mashur, where new jetties are being built.

Both exploration and drilling will be stepped up. Additional geological, geophysical, and survey parties will work throughout the Agreement area and the number of rigs will be increased to nine.



Housing and welfare programmes will altogether absorb £10,000,000, and 1320 new houses for employees of the companies are planned. New medical facilities costing approximately £1,000,000 will be provided at the joint expense of the operating companies and of the National Iranian Oil Company.

Wakefield Enters Chemical Industry

A further expansion of the trading interests of the Wakefield Group of Companies, headed by C. C. Wakefield & Co. Ltd, is announced.

For many years the Group has been a large-scale producer of chemical additives for lubricating oils of its own manufacture. Certain of these additives will now be available to the outside market and other chemical products not necessarily connected with lubricants will be produced and marketed.

The chemical products of the Group will be marketed through its Member Company, Edwin Cooper & Co. Ltd, 43 Grosvenor St, W.1. The Board of Directors of Edwin Cooper & Co. Ltd, has been reconstituted as follows:—L. M. Broadway, chairman; W. Helmore, deputy chairman; G. H. Thornley, managing director. Directors are: W. F. List, G. E. T. Eyston, J. A. V. Watson, L. G. Packham, J. C. Cragg, C. R. Woodfield. L. Colkett is a director and the secretary.

Oil Loading Terminal at Los Angeles

More than $2,000,000 is to be spent by the Port of Los Angeles on a new marine oil-loading terminal to accommodate the world's largest tankers.

Contracts have been awarded for a major dredging job to cost $1,470,000, and for building a dyke at the pier site for $639,117. Dredging of a fairway from the breakwater entrance to the dock site on the San Pedro side of the harbour will start shortly and 1,400,000 cu yd of earth are to be removed from the Outer Harbour to form a channel 500 ft wide and 45 ft deep with a turning basin 1200 ft in diameter in front of the pier.

Le Teja Refinery Expansion Plans

The capacity of the Administration Nacional de Combustibles Alcohol y Portland (ANCAP) La Teja refinery, Montevideo, Uruguay, will be more than doubled through a new expansion programme of five new units designed and engineered by The M.W. Kellogg Company, New York, a subsidiary of Pullman Incorporated. The additions comprise a 28,000 b.d. atmospheric and 10,000 b.d. vacuum unit, a 5000 b.d. (fresh feed) orthoflow fluid catalytic cracking unit, a 3000 b.d. Sinclair-Baker-Kellogg catalytic reforming unit, a gasoline stabilization and gas recovery unit, and a 4500 b.d. gasoline treating unit.

Major products of the new facilities will include high-octane gasoline, fuel oil, liquid petroleum gas, kerosine, diesel oil, and asphalt.

Natural Gas from Cousland

On 28 October the chairman of the Gas Council, Sir Harold Smith, K.B.E., officially opened the new natural gas supply line of the Scottish Gas Board between Cousland and Musselburgh.

The gas, from a 1600-ft deep well drilled before the war near Cousland, is led through a pipeline nearly 5 miles long to the Musselburgh works for mixing with coal gas.

The well-head pressure of the gas is 620 p.s.i. which is reduced in three stages to 3 p.s.i. at the works. It has a calorific value of between 930 and 960 B.t.u. per cubic foot compared with the declared value of the Musselburgh gas of 450 B.t.u. cu. ft, which is reduced to allow for the mixing. As a result it is estimated that 1 ton of coal will be saved for every 7000 cu. ft of natural gas used.

Reorganization of Pernis Refinery

In order to reflect the dual nature—oil and chemical—of operations at Shell's Pernis refinery, near Rotterdam, two separate operating companies are being formed.

Shell Pernis Raffinaderij N.V. will be concerned with manufacture of oil products and Shell Pernis Chemische Fabrieken N.V. with petroleum chemicals. The policies and working programmes of the two companies will be closely co-ordinated.

This reorganization will be implemented gradually and will be completed by 1 January 1958. It will not affect manufacturing programmes or execution of current contracts. There will be no change in management at Pernis nor in terms of employment of the staff.

Lubricants for Nuclear Power Stations

Extensive research on the design of lubricants to withstand degradation from exposure to radiation in a nuclear power station has been proceeding for some time at the Hayes Laboratories of C. C. Wakefield & Co. Ltd.

Of the four fission products that occur at such stations—alpha, beta, gamma, and neutron radiations—the first two, because of shielding, are generally harmless to lubricants, but gamma and neutron radiations can thicken oils to unserviceability and solidify greases.

Behaviour of each material requires individual study. Many samples were exposed to radiation to supply data from which a special range of lubricants—chosen for Chapelcross—has been evolved.

New French Exploration Area

The Société des Pétroles de Valence, in which the BP Group has a 50 per cent interest, has been granted a new oil exploration permit covering 27,300 hectares near St Julien-en-Born on the south-west coast of France.

Preparations for drilling the first deep test well in the Luberon area north of Marseilles—one of the Company's three licensed areas—are being made.

In the Valence basin two test wells have produced no commercial result but a third is being drilled.

BP's First 34,500-ton Tanker Launched

Recently launched at the Wallsend-on-Tyne shipyard of Swan Hunter and Wigham Richardson Ltd was *British Architect*, the first 34,500-dw ton tanker for the BP Tanker Co.

She has an overall length of 683 ft and a service speed of 15½ knots.

Tankers of up to 65,000-dw tons are on order for the Company.

Plans and Progress of NIFES

Speaking at the Third Annual General Meeting of the National Industrial Fuel Efficiency Service, Sir Leslie Hollinghurst, chairman, stated that NIFES' income had been guaranteed for a further 5 years by the sponsoring organizations that now comprised the National Coal Board, the Central Electricity Authority, the Gas Council, Shell-Mex and B.P. Ltd, Esso Petroleum Co. Ltd, and the South of Scotland Electricity Board.

R. H. Thomas, a board member of the National Coal Board, had joined the board of directors.

Further support was needed from fuel users and fees charged had not covered increased costs of the services. NIFES' engineers had made 13,493 visits to factories, an increase of nearly 1000 over the previous year. Heat and Power Surveys showed an increase of 14 per cent in engineer days and regular Service Agreements rose from 262 to 426.

Scope for future fuel savings was great. About 10 million tons of coal p.a. could be saved in industry at a total cost of £100–£150 million. Manufacturers were becoming more aware of the importance of fuel economy but provision of the necessary equipment was hindered by financial restrictions. Easier capital investment would greatly benefit the nation and fuel efficiency schemes should have a higher priority than they did at present.

BP Continental Refineries Expansion

After major modifications two of BP's Continental refineries can now process an extra 1,500,000 tons of crude oil p.a.

The capacity of Antwerp refinery, owned jointly by BP and Petrofina, has risen from 3,000,000 to 4,000,000 tons p.a. In 1953 two new units, a 400,000 tons p.a. hydrofiner for removing sulphur from gas oil and a 350,000 tons p.a. catalytic reformer for production of a high-grade motor spirit component are to be commissioned.

BP's Hamburg refinery has increased processing capacity from 1,500,000 to 2,000,000 tons p.a.

Change in Tanker Company Operation

Because of continued growth of its tanker fleet British Petroleum Co. Ltd has arranged for part of its fleet to be operated by a subsidiary managed separately from the existing organization, BP Tanker Co. Ltd.

The Petroleum Steamship Co. Ltd (for many years owners of a number of small craft of the BP Group) has been renamed the BP Clyde Tanker Co. Ltd. Several tankers will be transferred to it by the BP Tanker Co. Ltd.

Until the second half of 1958 the Company's offices will be at Britannic House, Finsbury Circus, London E.C.2, but will later be transferred to Glasgow.

Last Shell-Mex and B.P. Estuarial Tanker Launched

The *Shell Traveller*, 460-dw tons, was recently launched broadside from the yard of Cook, Welton and Gemmell at Beverley, Yorks.

She is the last of nine estuarial and river tankers built for Shell-Mex and B.P. Ltd at a cost of more than £600,000.

She will operate in the Bristol Channel and the Severn.

"The Scallop"

On the occasion of its Golden Jubilee in 1947 the "Shell" Transport and Trading Company Ltd published a booklet describing its progess and expansion. To celebrate its Diamond Jubilee on 18 October 1957 the Company issued to all shareholders a handsome volume dealing with the scallop.

The Rt Hon. Lord Godber, chairman of the Company, refers in his foreword, to the reasons which inspired Marcus Samuel, who with his brother Samuel Samuel founded the Company, to select the shell as the Company's badge and title. He no doubt drew his inspiration from the sea-shells which were sold by his father, Marcus the elder, in Victorian days.

The Pedigree of "Scallop"

In the first chapter, Dr B. Woledge, Fielden Professor of French at University College, London, discusses the pedigree of the word "scallop". He traces it and its related words from the forests of prehistoric Germany to the England and France of today. Centuries before Christ the Germanic tribes of Central Europe had a word consisting of the sounds SKAL followed by various endings.

Words of the SKAL group were carried into different languages and developed a host of meanings. They were brought to England when Hengist and Horsa landed in Kent in 449, and the Anglo-Saxons turned the SK into SH. Meanwhile, another group of Germanic wanderers had settled in what is now known as the Netherlands and had introduced words of the SKAL group which are still in use. The modern Dutch words for "shell" and "rind" are *schil*, *schel*, and *schelp*,—the latter has become *escalope* in French and *scallop* in English.

The Living Scallop

The next chapter, by Dr W. J. Rees of the Natural History Section of the British Museum, dealing with the living scallop describes it as a member of the bivalve sub-group of the mollusc group of animals. Unlike its inactive relatives, the scallop is a lively creature and can swim in its own fashion. The general term "scallop" applies to nearly three hundred different species, all conforming to the general pattern which was called *Pectin* by Pliny.

Dr Rees discusses the habits and organs of the scallop and describes and illustrates its swimming movement. A feared enemy of the scallop is the starfish and a series of fine colour pictures shows first the method by which the starfish captures a scallop, and secondly how the latter can escape.

An Ancient Symbol

Sir Mortimer Wheeler, C.I.E., M.C., in the third chapter outlines the use of the scallop as a symbol in ancient times. As he points out in his opening sentence "The art of the classical world is strewn with scallop shells". Illustrating this chapter are pictures which include an ancestral altar at Herculaneum, a Greek terra-cotta of "The Birth of Aphrodite", a mosaic floor in Verulamium, St. Albans, a sarcophagus from Sidamara, and Phoenician coins.

The Badge of St James

At Pontevedra in north-west Spain is a church built in 1778, the plan of which was intended to represent a scallop shell. Over the main altar is an image of Our Lady *La Peregrina*—the blessed Virgin as a Pilgrim, dressed to go riding and the turned-up front brim of her hat has in the middle a large gold scallop. Over the dove outside is again *la Peregrina* between the figures of St James the Greater and St Roch. Both are liberally bedecked with scallop shells. In this chapter, Christopher Hohler, of the Courtauld Institute of Art, University of London, discusses the legend of St James and leads up to the pilgrimage to Santiago. He mentions that the first literary evidence for the scallop being the badge of the pilgrimage was in the *Liber sancti Jacobi* (about 1130).

The Cradle of Venus

Many instances of the use of the scallop shell in art and decoration are given in the fifth chapter, by James Laver, C.B.E., of the Victoria and Albert Museum. He draws his examples from various realms. For example Botticelli's *Birth of Venus* (1478) showed Venus being wafted landward poised upon a scallop shell, and in many works of art the shell became almost a convention.

In the field of architecture and sculpture there are numerous examples of the use of the shell, and illustrations are also given of its use in designs.

In Armoury

The earliest known examples of the use of escallop shells in armorial bearings appear on seals and rolls of arms of seven or eight hundred years ago. Approximately four per cent of the known English coats of arms have the shell as a principal part of the design.

In this chapter the Hon. Sir George Bellew, K.C.V.O., Garter King of Arms, shows how the herald painter of old depicted the shell according to his own ideas. It was only in about the sixteenth century that the scallop shell, like other heraldic forms, tended to become more natural.

In the Americas

In this chapter, Adrian Digby, of the British Museum, says that there is no doubt that the scallop was an important article of diet for early coastal inhabitants in the Americas.

As an article of use, the earliest example of American man's attempt to use a pecten shell comes from the Taltal region of Chile. It probably belonged to the huntsmen of about 3000 B.C. Examples of its incorporation in the design of vases and pottery are given from Mexico, Guatemala, and British Honduras. It is concluded that the Americans derived similar stimulation from the scallop as did their contemporaries in the Old World.

The Gastronomic Art

The final chapter, by Paul Gaultier, president de l'Académie des Gastronomes, and translated by Dr Sir Gavin de Beer, has indeed an appetizing flavour, for it deals with the scallop at the table. A description of scallops reads: "*Their plump bodies, white as mother of pearl, and their roes shaped like scarlet beans containing the eggs, when simply scalded or poached have a delicate taste of incomparable subtlety*".

There are said to be thirty-six ways of preparing scallops by plain cooking.

Primarily for shareholders and for purchase by the staff of the Shell companies, a limited number of copies are available for sale to the public. Price, post free, is 14s 3d and written application should be made to The Shell Petroleum Co. Ltd, No. 1 Kingsway, London, W.C.2.

Books and Films

Festival of Films in the Service of Industry

Recently concluded at Harrogate was the 1957 Festival of Films in the Service of Industry, the first of its kind to be held in Britain. Its purpose was to demonstrate the uses of some recent films made for major British industrial organizations, and to enable sponsors to study techniques.

About 300 films were submitted under eight categories. After preliminary elimination, among the one-third remaining were entries by eight oil companies, but the only awards gained by the industry were to the Shell Petroleum and Shell-Mex and BP organizations.

In category D (Technical and Technological Films) Shell Petroleum gained a Festival Plaque (First Prize) for *High Speed Flight. Part I, Approaching the Speed of Sound*, and in Category I (Industrial Productivity) Shell-Mex and BP received a Certificate—Highly Commended (Second Prize) for *Mechanization of Livestock Farming*.

The Executive Committee of the Festival comprised representatives from the Federation of British Industries, the Central Office of Information, the Scientific Film Association, the Trades Union Congress, the Association of Specialized Film Producers, The British Productivity Council, and the British Employers' Confederation.

The Right Hon Lord Mancroft, M.B.E., T.D., Minister without Portfolio, speaking at the opening of the Festival. Seated, is The Right Hon Lord Godber, chairman of the "Shell" Transport and Trading Company Limited, who acted as President of the Festival.

Energy and Man

Twelve articles by writers eminent in different aspects of the subject and tracing the story of energy from its origin in the first primeval mass to the latest technological advances form a special issue of the Esso magazine for September, under the general title *Energy and Man*.

Sir Harold Hartley briefly reviews man's gradual adaptation of powers latent in nature for his own benefit, as for example in the controlled use of heat which culminated in the steam turbine and the internal combustion engine. He avers that nations have now become energy conscious. Mechanization and scientific processing were the keys to productivity and the exploitation of its energy resources should be the primary consideration of the economic policy of every country.

In the second article, by Professor C. Payne-Gaposchkin, the reader is transported from the problems of energy on the earth to the vastness of interstellar space for a survey of the yet unused potentials of energy in the galaxies and stars. There are five forms of energy known to exist in the universe and their estimated total potential is quoted. The article concludes with some theories on the origin of the universe.

Starting with the well-known premise "Energy is indestructible", Professor Ubbelohde, who writes the third article, describes the basic sources of earth's energy from the thermonuclear energy derived from the sun. Three other very important sources are mentioned, but man has not yet found a satisfactory method of utilizing them. They are the power of tides, volcanic heat, and frozen nuclear energy. Useful tables of world coal and oil reserves and consumption of solar energy accompany his article.

There are many definitions of life states Professor Dauvillier of the College de France in sketching the evolution of living organisms on the earth. He mentions three stages of life, the first perhaps about 4000 million years ago, and he concludes that life itself is one of the available routes in the conversion of solar radiation to other forms of energy.

Of more technical interest is a survey of currently available sources of energy by Dr Parker. His list extends from solar radiation through fossil fuels to atomic energy. Two sources of which comparatively little use is being made are wind power and terrestrial heat energy, which are capable of providing a useful supplement to total resources. Tables of coal reserves for the main countries of the world are given and an estimate of proved resources of petroleum. World energy production and consumption in 1956 is shown graphically in a double-page full colour diagram, which covers the four major sources of energy, coal, oil, hydro-electricity, and natural gas.

An introductory article on the four-sided partnership of coal, oil, natural gas, and water strikingly emphasizes the world's lessening demands on coal. Probable future demands are assessed and the impact of atomic power is considered. Statistics covering over 130 years of world energy consumption and the U.K. energy balance for three dates during the past two decades show the changing trend of requirement in terms of coal equivalent.

There follow three sections, dealing respectively with future prospects of coal, hydro-electricity, and oil.

A review of coal output for significant years since 1800 forms the prelude to estimates of future output and the National Coal Board's development schemes are outlined

with special emphasis on technical progress in mining and the utilization of coal. Secondary-quality coal, of which there are ample reserves, can only be used for steam-raising, gas-making, or the synthesis of oil.

Although Britain does not lack hydro-electric stations, those at Galloway, Sloy, and Tummel being notable examples, Norway and Canada in each hemisphere show much greater scope for their construction. In Britain pumped storage schemes are likely to be used more but it is in undeveloped areas of Africa and Asia that possibilities for this form of energy production are most promising.

During its comparatively short history (less than a century) no important industry has shown greater changes than the oil industry. A revolution in its development was occasioned by the rapid demand in liquid fuels necessitated by the evolution and popularity of the internal combustion engine. The present shape of the oil industry is also determined by the steeply rising world demand for heat units as well as for supplies of fuel for transport on sea, land, and in the air. The oil industry is essentially dynamic and certain interesting developments in exploration, refining, and research are given. Fortunately there is no lack of oil, which is now contributing the major share to the energy requirements of the entire world.

"Solar Energy—a Challenge to the Future" is the title of Dr Heywood's contribution which examines the characteristics of solar radiation, the operating principles of radiation collectors, and present-day applications in U.S.A., India, and France.

The final article is by Sir John Cockcroft and Kenneth Jay on the theory and practice of atomic power. They explain in simple terms how energy is derived from nuclear fission and mention various practical types of reactor and the vast possibilities of the future from increasing use of this source of power.

The magazine is profusely illustrated with diagrams and photographs, many of which are in full colour. Copies are obtainable from Esso Petroleum Co. Ltd, 36 Queen Anne's Gate, London, S.W.1.

SMBP Motor Show Film Première

This year the film première given by Shell-Mex and B.P. Ltd on the occasion of the London Motor Show followed the lines of its predecessors. Two films were shown to a highly appreciative audience, these being *Grand Prix d'Europe* 1957 and *Route des Cimes*. The première was held in Shell-Mex House and the main dining-room was transformed for this purpose. A feature of the decoration was a series of panels illustrating travel through the ages, e.g., passenger transport from the tumbril to the black maria, from the early omnibus to the modern luxury coach, and so on.

Grand Prix d'Europe, 1957

For the first time in 33 years a British driver in a British car has won the Grande Epreuve, and the Shell-Mex and B.P. film *Grand Prix d'Europe* 1957 is a thrilling account of how Stirling Moss drove the Vanwall to victory after having switched cars with Tony Brooks, another member of the Vanwall team, after 23 laps of the Aintree course. In the 20 minutes of this film are packed all the excitement of this 90-lap race in which Moss averaged 86·8 m.p.h. He also set up a new lap record for the circuit of 1 minute 59·2 seconds at a speed of 90·6 m.p.h. The film does not however concentrate entirely on the British victory but shows all the other

Stirling Moss (right) *and Tony Brooks*

thrills of this event. Made by Random Film Productions Ltd, the film is in black and white, and copies can be obtained on loan from the Shell-Mex and B.P. film library as usual.

Route des Cimes

Also shown at the Shell-Mex and B.P. party was the BP film *Route des Cimes* which illustrates the daily winter journey of a 2500-gallon road tanker over the 160 miles from the depot at Chambery to the village of Val D'Isere in the French Alps. The village with its hotels, hospital, and homes relies almost entirely on this supply of fuel and in order to complete his journey the driver must leave Chambery in the darkness of the early morning. The film illustrates the whole of this journey showing the driver manoeuvring his 12-ton truck through narrow cobbled streets, through paths cut in the snow, where at times it is necessary for his helper

A tight squeeze on the road to Val D'Isere. The driver's mate has to climb out of the window to help free the BP road tanker stuck in the snow

to climb through the cab window and clear the way for the vehicle. Included are also shots of skiers, and altogether the film is well worth seeing. This film is in colour and is available on loan from Shell-Mex and B.P. Ltd.

Castrol 1957 Films

While the 1957 Castrol racing films are primarily designed to appeal to motor and motor-cycling clubs, there is much in them to be of interest to any gathering catering for relaxation from the hum-drum of day-to-day events. Pride of place must go to *Monaco Grand Prix*, 1957, a 35-minute account with an excellent commentary by Raymond Baxter. Starting and ending with some very fine shots of Monaco and its normally peaceful existence, the intervening sequence depicts one of the most sensational races of recent years. Moss, Collins, and Hawthorn all eliminated early in the race and Brooks gave a remarkable performance in the Vanwall to take second place to Fangio in a Maserati. A real thriller with some very pleasing pictorial scenery and backgrounds.

The second Castrol 1957 film tells the story of the *Thruxton Marathon*, the third in the series of National nine-hour races for motor cycles organized by the Southampton and District Motor Club. In 25 minutes is seen the transformation of the Thruxton aerodrome, Hants, from its normal use to a race track—many of the sequences were in fact filmed from the air. Run in typical British summer weather varying from near tropical heat to heavy rain, this year's race was a real test of endurance, apart from the fact that the two riders of each machine between them made over 200 laps of the course. It is a tribute to their stamina and the quality of the machines that 21 out of 43 completed the race. The commentary is by Franklin Engelmann.

Both films were produced by Stanley Schofield Productions Ltd, and are available on loan from the Castrol Film Library, C. C. Wakefield & Co. Ltd, 46 Grosvenor Street, London, W.1

A New Stainless Steel

Recently Firth-Vickers Stainless Steels Ltd have introduced a new type of stainless steel particularly applicable for air frames and "skin" purposes. Known as FV 520 it is the only austenitic type of stainless steel hardenable by low-temperature heat treatment. In connexion with their operations the Company has available two new colour films depicting the use of their products and their manufacturing processes. No. 5 deals with *The Manipulation of Corrosion and Heat-resisting Steels* and illustrates various types of welding, bending, machining, pressing, and polishing. The second film, No. 6, comprises a tour of the works and shows how the bars, sheets, strips, and castings are prepared. It also indicates the wide domestic and industrial usages of stainless steel. Both are 16 mm in Kodakcolour and are available on free loan on application to the Company at Staybrite Works, Sheffield 9.

Industrial Screen

The September October issue of *Industrial Screen* contains special features on the recent First Festival of Films in the Service of Industry together with a stand-by-stand review of exhibits.

Technical articles deal with camera construction and photography, case histories of industrial use of films are given, and a section is devoted to films and agriculture.

Industrial Screen is published by Robin Publications Ltd, 136 Strand Buildings, London, W.C.2.

Trade Literature, etc.

Mobil's Improved Service

During recent months, Mobil Oil Co Ltd have greatly extended the facilities available to their customers at all large exhibitions. In particular, they have concentrated on the speedy, clean, and efficient delivery of fuels and lubricants to other stands.

The keynote to this improved service is a new exhibition service vehicle, which can carry four barrels and tow a trailer of the same capacity for larger fill-ups. Four pumps permit pumping of the company's products either to or from a particular set, and four hose-pipes avoid contamination between products of varying viscosities. The pumps are trigger-controlled from the hoses, making it possible for one man to effect a complete delivery or transfer.

This vehicle was first used at the Marine and Engineering Exhibition in September, but it will be seen at all exhibitions in which the Company has an interest.

New German Subsidiary for Canadian Company

Emco Ltd, of London, Ontario have formed a German wholly-owned subsidiary company, Emco G.m.b.H., Allendorf, Krs., Marburg Lahn. This subsidiary, with Emco Brass Mfg Co. Ltd, of Westwood, Margate, the English subsidiary, will supply demands of the Emco-Wheaton line of oil-marketing equipment outside the dollar area.

Officials of the German Emco G.m.b.H., are:—J. H. Stevens (President of Emco Ltd, Canada), chairman, advisory board: W. F. Judd (managing director of Emco Brass Mfg Co. Ltd) vice chairman, and E. Kirchner of Hamburg, member of advisory board.

Change of Address

Griffin & George Ltd, laboratory furnishers, announce that their sales office and warehouse for the Birmingham area is now in Frederick Street, Birmingham, 1 (CENtral 2552).

The telephone number of their Edinburgh office at Johnston Terrace has been changed to CALedonian 4868.

Heating the Home by Oil

How an oil-fired boiler can provide fully automatic central heating and hot water for the average-sized home at moderate cost was shown by a working exhibit on the Shell-Mex and B.P. stand at the Building Exhibition in November.

The heating system utilized forced circulation of hot water through small-bore copper pipes by a silent electric pump.

Heat is provided by an oil-fired boiler suitable for houses up to 1800 sq. ft. A room thermostat, normally fitted in the hall or living-room, controls the radiators, and an independent boiler thermostat regulates the temperature of the tap hot-water supply.

The oil burner switches itself on and off automatically, but a time clock is also provided; this would normally be set to switch the burner off at night and on in the early morning.

Colouring of Petroleum Products

Colouring of gasolines and other petroleum products is claimed to be greatly simplified by the use of a new 25 per cent concentrate in fluid form produced by Patent Chemicals Inc, of Paterson, New Jersey. Available in all colours, it is readily pumped and metered into the finished fuel, and is said to be ideal for pipelines, tank car, tank wagon, and small batch colouring of gasolines, as well as for simplified colouring of diesel fuels, fuel oils, lubricating oils, automatic transmission fluids, break-in oils, and greases.

Floating Suction Units

Established practice provides a settling time between "input" and "output" from airfield tankage, allowing water and sediment to precipitate out of the fuel prior to use.

In conjunction with an international petroleum company, Emco Brass Mfg Co. Ltd have developed a "skimming device" of the floating suction type to remove such contamination.

The unit automatically positions the suction intake 12–14 inches below the liquid level, deep enough to prevent "vortex" at high pumping rates.

The 4-inch unit can handle a flow of 200 g.p.m. and the 6-inch 500 g.p.m. Other sizes range from $1\frac{1}{2}$ to 8 inches.

Wakefield-Dick to Lubricate Chapelcross

Wakefield-Dick Industrial Oils Limited, the industrial member of the Castrol group of companies, have been chosen by the United Kingdom Atomic Energy Authority to lubricate the Chapelcross nuclear power station.

They will also supply lubricants to the Berkeley nuclear power station of the Central Electricity Authority.

Flameproof Electric Fork Truck

Built to Buxton requirements, the Conveyancer flameproof electric fork truck provides the advantages of battery electric operation in fire hazard areas.

There is no loss of manoeuvrability as the outer turning radius of 77 inches is only 4 inches greater than the standard model. Battery ventilation is based on Ministry of Fuel and Power Test Memorandum No. 11 and Safety in Mines Research Establishment Report No. 122.

External wiring is by mineral-insulated copper clad cables through conduits by screwed flameproof glands which house and protect the sealing termination.

The capacity of the truck is 4000 lb at 20 inch load centre and a 4500 lb version will also be available.

Lubricating Oils in the Linen Industry

Oil staining of yarn and cloth has in the past been a serious and costly problem in the linen trade.

Three types of oil are required, for drafting rollers, for ring spinning, and for flyer-type spindles respectively but each must satisfy difficult and conflicting requirements.

These requirements are summarized in an industrial technical bulletin issued by the Mobil Oil Co. Ltd in connexion with their range of Mobil Etna SS oils which have been developed especially for the linen industry.

Copies of the pamphlet are obtainable from Mobil Oil Co. Ltd, Caxton House, London, S.W.1.

Polygon-shaped Platinum Crucibles

A new polygon-shaped crucible has considerably greater stability, versatility, and ease of handling than conventional standard round types.

Because of its flat sides, a better surface is provided for tongs and the tendency to crimp is avoided.

There is always a corner "spout" opposite each flat side which facilitates easy pouring, and two crucibles can be picked up and handled at one time.

Literature is available from Baker Platinum Division, 52 High Holborn, London, W.C.1.

New Version of Gas Refrigerating Machine

Philips Electrical Ltd, Shaftesbury Avenue, London, W.C.2. announce a new version of their gas refrigerating machine, the PW 7000.

It is a compact, electrically driven single-cylinder unit, and can produce 5 litres of liquid air or liquid nitrogen an hour, within 15 min of starting. A unique feature is that gas to be liquefied undergoes no compression or passes through any working parts, which gives a very pure product. Only one hour is needed for defrosting and draining of the freezer after 16–20 hours' production. Moisture and carbon dioxide are removed simply by freezing.

Small and of light weight compared with conventional plant it requires no supervision for continuous operation; it has fully protective safety devices and low operation costs.

Mobile Exhibition

A 35-ft long articulated vehicle is being used by Sunvic Controls Limited as a mobile exhibition throughout Britain and on the Continent of their comprehensive range of instrumentation.

The vehicle contains working display panels of the stability of a pressure regulator; the internal operation of a controller and its absence of moving parts; ease of maintenance and adjustments of plug-in controllers; section temperature and level transmitters; pressure regulators and controllers.

Of particular interest is the 12-point demonstration data logger, designed for continuous scanning of points measuring variables such as pressure, flow, level, and temperature. It presents the information as a printed log sheet or as punch tape suitable for input to a computer, and will also give warning if any point or group of points exceed pre-set limits. Input signals can be electrical, pneumatic, or a combination of both.

The vehicle is fitted with projector and screen for lectures and there is accommodation for approximately 20 people. Visitors can be entertained and discussions held in the office at the forward end of the caravan.

Motor Spirit Demand in N.E. London

The Shell-BP Silvertown installation, one of Britain's oldest oil distributing depots, has recently undergone a transformation which makes it among the most up to date. The reason is to increase its capacity to about 40 gal/sec per pump to meet the demand for motor spirit in North-East London.

The installation, built on an old wharf, allows river tankers to discharge 500 tons of petroleum in less than 90 min.

The magnificent office block is to house the entire North-East London Branch staff who supply not only motor spirit but white oils and lubricating oil at the rate of approximately 1000 tons per day.

The man responsible for the smooth running of this installation is Branch manager Tim Lewis, O.B.E.

New Multi-combination Test Set

Metal and Pipeline Endurance Ltd, Victoria St., London, S.W.1 have introduced a new mark II multi-combination test set, incorporating in a single portable meter, all measuring instruments normally required for field testing in electrolysis, corrosion investigation, and cathodic protection testing.

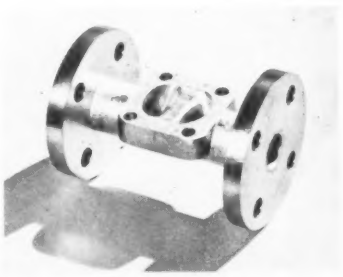
The instrument can be a valuable time saver, its weight is light compared with the numerous separate instruments usually required, and its bulk is much less.

New Backhoe Catalogue

A two-colour catalogue on the design and performance of a new model hydraulic backhoe has been published. The machine is built as a unit for the Caterpillar D4 and 955 tractors and has many uses.

Copies are obtainable from Hyster Company, 2902 N.E. Clackamas Street, Portland 8, Oregon, U.S.A.

Titanium Castings



Small titanium castings are now being produced—for the first time in Britain—as a result of a research and development programme initiated by the Metals Division of Imperial Chemical Industries Ltd.

Titanium is important in the aircraft and chemical industries because of its strength, low density, and excellent corrosion resistance and the ability to produce complicated shapes in quantity to a single pattern by casting techniques offers obvious advantages.

In the production of such castings however, certain problems occur not normally experienced in foundry work, but in the technique developed, sound contamination-free castings are produced in less than 10 sec.

Diesel Drilling Units

A pamphlet under the above title, recently issued by English Electric Co. Ltd, illustrates diesel sets for oil-well drilling. Power ranges are from 336–547 to 1344–2190.

A second publication gives data on the SRKT/SVT range of engines for use in diesel-electric locomotives.

New U.K. Agents for German and American Electronic Instruments

Winston Electronics Ltd, Shepperton, Middlesex, have been appointed sole United Kingdom Agents for a number of industrial electronic control instruments manufactured by Beckman Instruments, G.m.b.H., Munich, and Beckman Instruments Inc., Fullerton, California.

The instruments have wide industrial applications, for example with gas and air compressors, coils and valves, refrigeration, the manufacture of electronic components, transformer casings, glass-metal seals, and in transport, gas, and fluid-handling engineering industries.

Anti-Corrosion Coatings

At the recent Corrosion Exhibition in London, E. & F. Richardson Limited of Buckingham showed a highly significant advance in the coatings field. In co-operation with Dunlop, they have developed a series of coatings based on neoprene (a synthetic rubber). It is claimed that by using these coatings and standard painters' equipment a $\frac{1}{32}$ inch thickness of neoprene, firmly bonded to the metal substrate, can be applied in a working day. The coating is equally suitable for protection against 50 per cent sulphuric acid or 50 per cent caustic soda.

New Diaphragm-operated Control Valve for Very Small Flows

The Crosby Valve & Engineering Co. Ltd of Wembley, are now manufacturing a new diaphragm-operated control valve for pilot plant, dosing, and similar applications. It has 18 8 stainless steel body rated at 6000 p.s.i. with $\frac{1}{2}$ inch female connexions for BSP or API. Alternative trims down to a minimum flow coefficient of 0·07 are available. The valve can be used for pressure drops up to 5000 p.s.i.

Eductor Drum Washer

Watts Fincham Ltd, St Helen's Place, London, E.C.3 have designed an eductor drum washer as a unit to be used singly or added to as required.

For its size it has a high output and operator fatigue has been greatly reduced, because drums have only to be rolled, and not lifted, into position.

The high-pressure spray covers all internal surfaces of the drum, and the system of simultaneous spray and eduction ensures removal of the suspended dirt and solids. Since the rate of extraction is higher than the inflow, build-up is completely eliminated.

★ ★ ★

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Forthcoming Meetings

THE INSTITUTE

(*At* 61 *New Cavendish Street, London, W.*1., 5.30 *p.m.—tea* 5 *p.m.*)

Lubrication Problems arising from Railway Traction Modernization. W. R. Broadbent, M.I.Loco.E., and G. A. Dickins, B.Sc., A.R.I.C., F.Inst.Pet. **1 January 1958**

IP ECONOMICS AND OPERATIONS GROUP

(*At* 61 *New Cavendish Street, London, W.*1., 5.30 *p.m.*)

Oil Prices in 1957. E. A. Higgins. **19 December 1957**

Energy Studies. Dr R. Regul **9 January 1958**

IP ESSEX BRANCH

(*At the Railway Hotel, Pitsea*, 7 *p.m.*)

Annual General Meeting. Address by Bernard Braine, M.P. 7.30 p.m. **10 January 1958**

(*At "Shell" Club, Corringham*)

Annual Dinner Dance. **18 January 1958**

IP FAWLEY BRANCH

(*At Esso* (*Fawley*) *Recreation Club, Holbury*, 7.30 *p.m.*)

Annual Dinner. **20 December 1957**

Super Tanker Construction. T. B. Hutchison, M.I.Mar.E., A.I.N.A. **17 January 1958**

IP LONDON BRANCH

Film Evenings. **6 and 13 December 1957**

Dinner Debate. **21 January 1958**

IP NORTHERN BRANCH

(*At Warners' Theatre and Old Nag's Head Hotel, Manchester*, 5.30 *p.m.*)

Film Show and Hot Pot Supper. **10 December 1957**

(*At the Engineers' Club, Albert Square, Manchester* 2, 6.30 *p.m.*)

Linear Programming. **21 January 1958**

IP SCOTTISH BRANCH

(*At Recreation Hall, BP* (*Grangemouth*) *Refinery*, 7.30 *p.m.*)

Automation in the Oil Industry. Member of BP Staff. **19 December 1957**

(*At North British Station Hotel, Edinburgh*, 7.30 *p.m.*)

Annual General Meeting. Staff Training. Member of BP Staff. **23 January 1958**

IP SOUTH-EASTERN BRANCH

(*At King's Head Hotel, Rochester*, 7.30 *p.m.*)

Annual General Meeting and Film Show **7 January 1958**

IP SOUTH WALES BRANCH

(*At Training Centre BP Refinery* (*Llandarcy*) *Ltd*, 5.30 *p.m.*)

Technical Support for Marketing. K. E. W. Ridler, Ph.D. **9 January 1958**

IP STANLOW BRANCH

(*At Blossoms Hotel, Chester*, 7.30 *p.m.*)

Joint Meeting with the Royal Institute of Chemistry

The Manufacture of Paint and Lacquer Solvents from Petroleum. F. E. Hixon, B.Sc. **18 December 1957**

(*At Lobitos Club, Ellesmere Port*, 7 *p.m.*)

Annual General Meeting and Film Show **15 January 1958**

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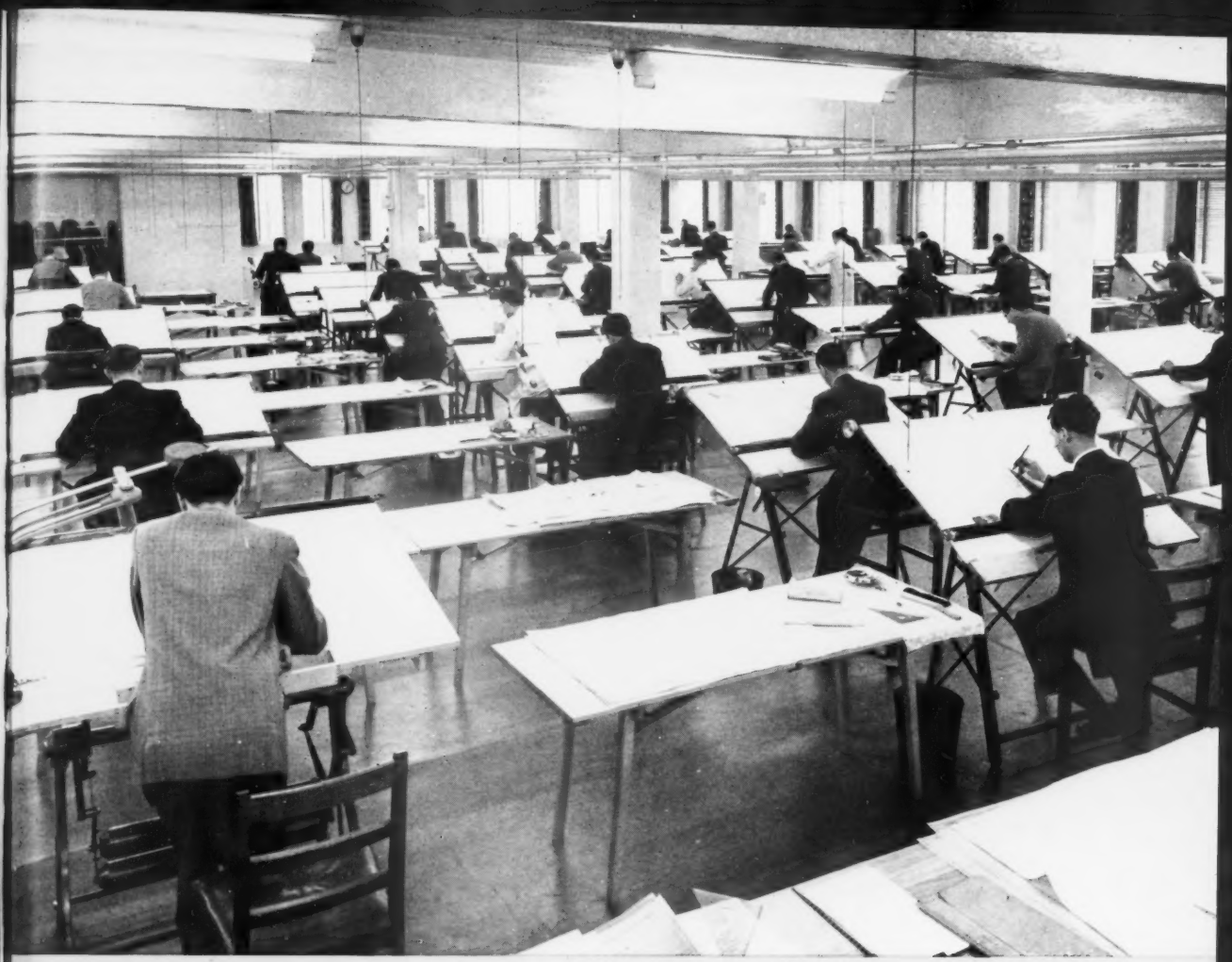

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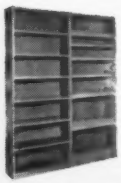

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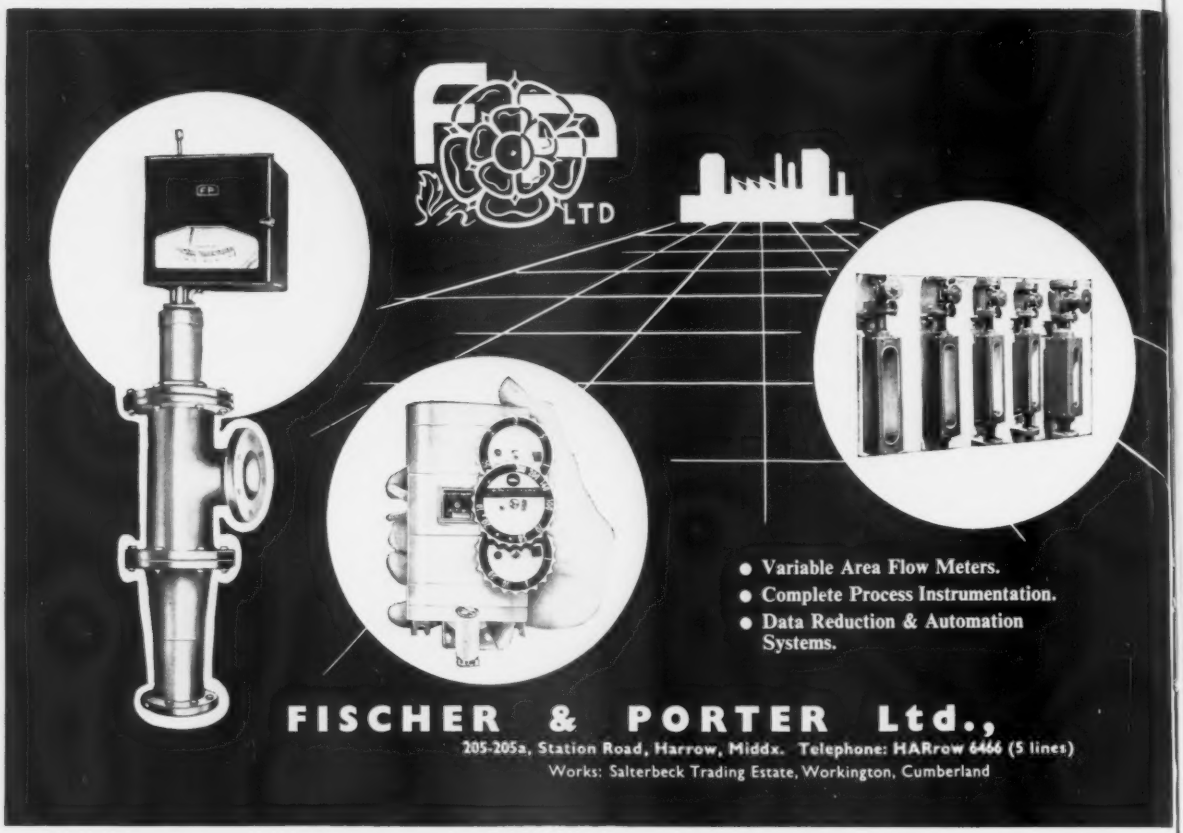
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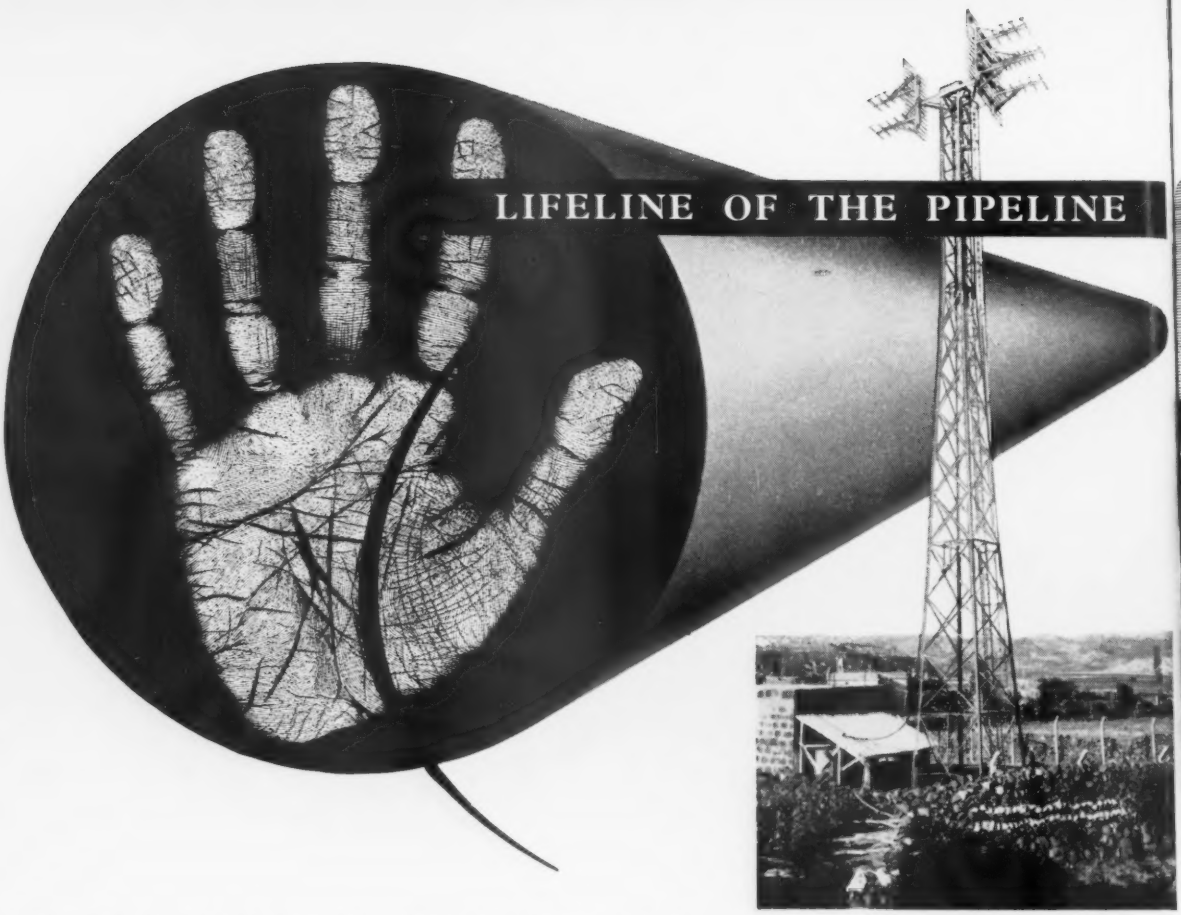

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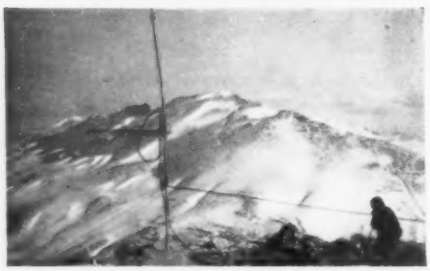

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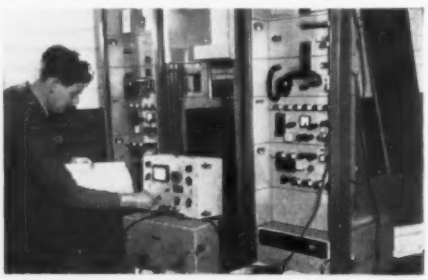

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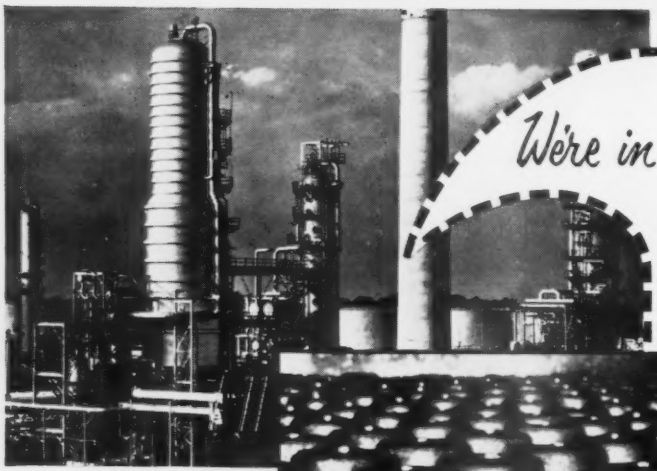

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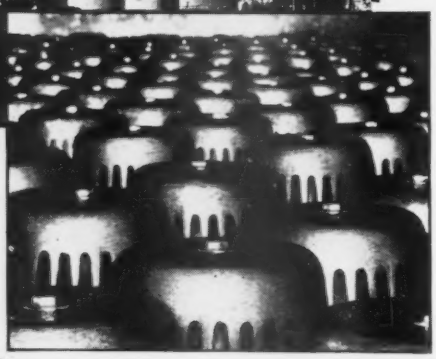

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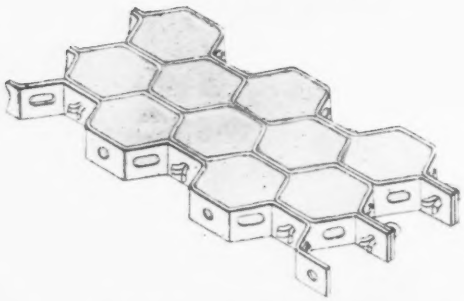

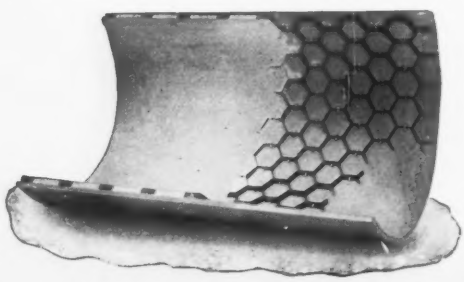

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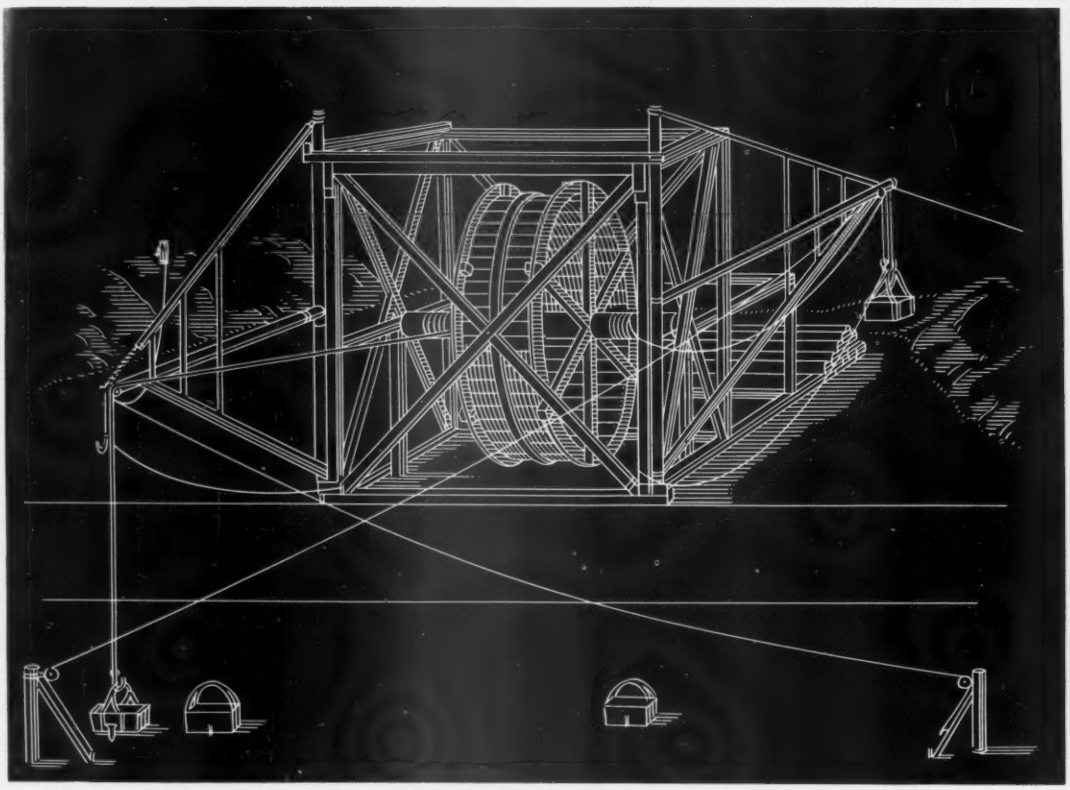

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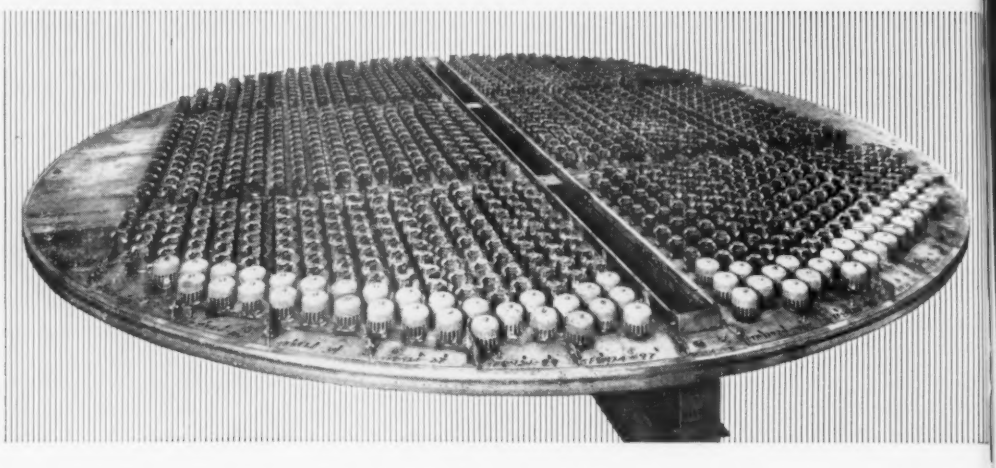

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	3	7½	¾	8	5	1/16	22⅛
	4	9	15/16	9	6 3/16	1/16	27
	6	11	1	10½	8⅛	1/16	35⅛
	8	13½	1⅛	11½	10⅛	1/16	45
	10	16	1 3/16	13	12⅛	1/16	53⅛
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	3	8¼	1⅛	11½	5	1/16	24⅛
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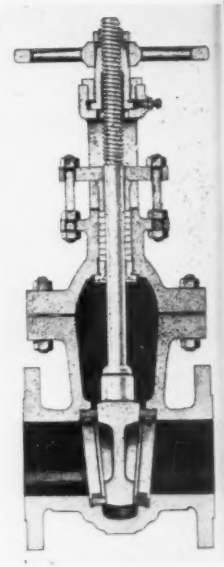
	6	12½	1 3/16	15½	8⅛	1/16	39⅛
	8	15	1½	16½	10⅛	1/16	47⅛
	10	17½	1⅝	18	12⅛	1/16	56⅛
	12	20½	2	19½	15	1/16	63⅛



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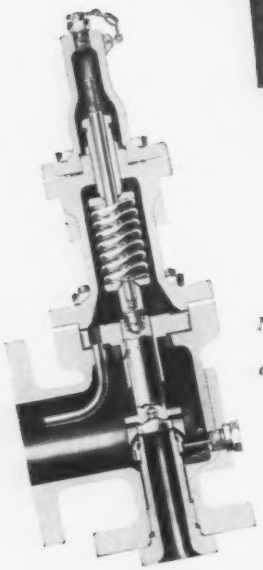

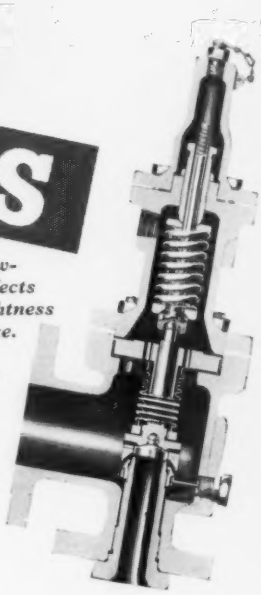

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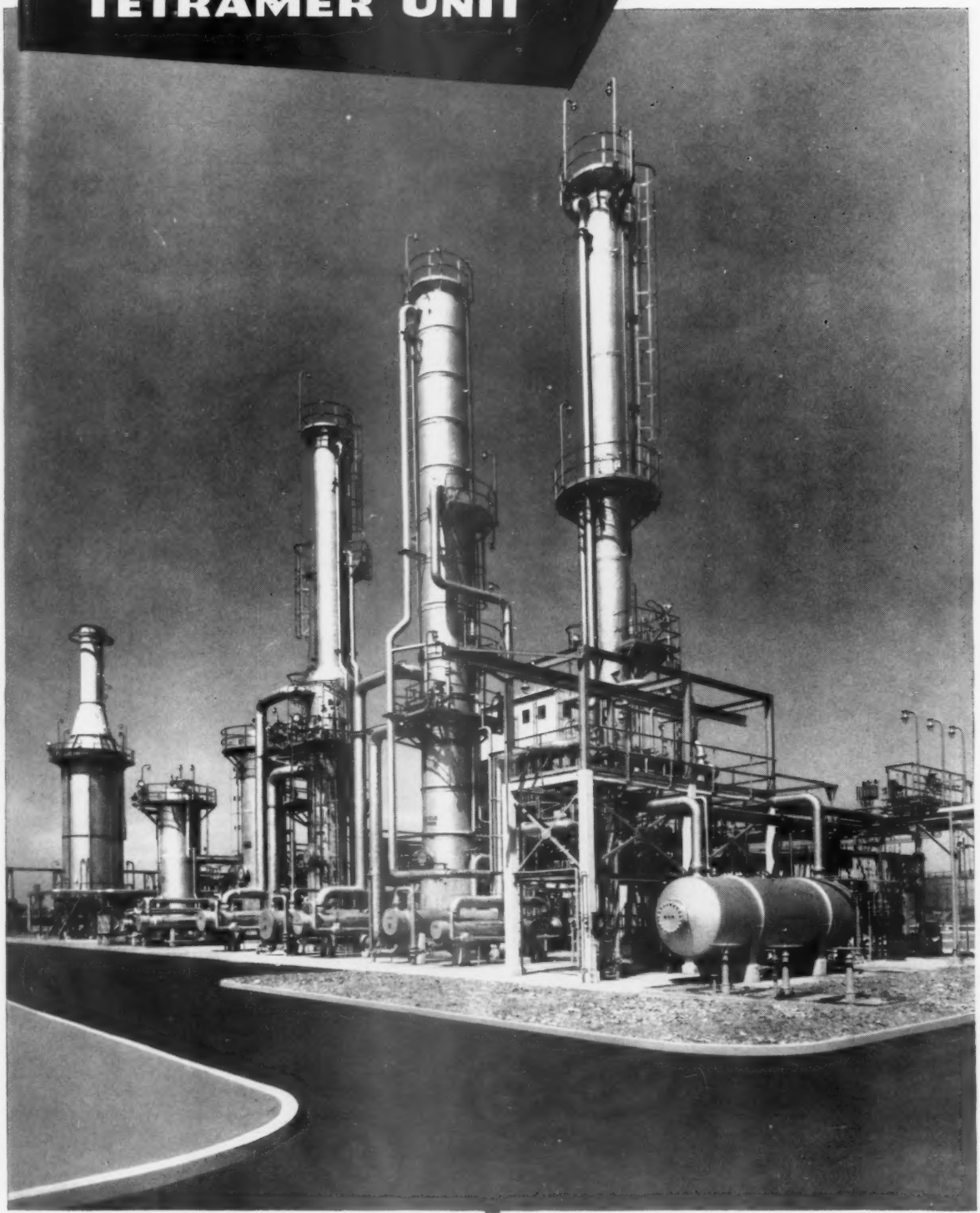

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